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"GERAET 1313"
for
Interception of 2-channel Radio T/P.
Details of Construction and Operating Instructions

TICOM
31st July 1945

No. of pages 72

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I. Preliminary description and instructions for operating Set 1313.

Set 1313 serves exclusively for reception of A 2 t/p traffic and can be used both for "current for mark" (+) and for "current for space" (-) working. The A 2 t/p system passes two messages in such a way that when the usual 5 impulse alphabet is used, firstly the 5 impulses of a letter, figure or symbol of message I are transmitted, then the 5 impulses for message II. Subsequently a phase signal consisting of 2 impulses is sent, to ensure synchronization. Hence $5 + 5 + 2 = 12$ impulses are required for the above procedure, all of which are of equal duration. After these 12 impulses have been sent out, the procedure is repeated, so that there follow the 5 impulses for message I, then the 5 impulses for message II, finally the 2 impulses for the synchronization signal, and so on.

Set 1313 separates the incoming messages, after it has been synchronised with the transmitter by means of the phase indicators sent, so that one teleprinter prints only message I and another teleprinter only message II. The normal telegraphic speed for teleprinters is 50 Bauds. In many cases, however, it happens that the telegraphic speed used by the transmitter is somewhat lower, for instance about 40 Bauds. To adjust the teleprinters connected to Set 1313 for these possible variations of speed, storers [speicher] are provided in Set 1313 for each message, which make it possible to vary the telegraphic speed. The start and stop impulses necessary for the working of a teleprinter are added in Set 1313 in a convenient order to the 5 impulses of every message coming from the transmitter.

Assembly of Set 1313

As shown in fig. 1, the following individual components are assembled in a frame and may be extracted from it; they are electrically connected together by wiring inside the frame:

- (1) 60 volt stage, see circuit diagram EVSt 1309-203
- (2) Electronic Rectifier II, see circuit diagram EVSt 1309-201
- (3) Electronic Rectifier I, see circuit diagram EVSt 1309-200
- (4) 12 volt stage, see circuit diagram EVSt 1309-778
- (5) Mechanical Section, see circuit diagrams BVSt 1313-146 and EVSt 1309-382
- (6) Reception Amplifier with regulating device, see circuit diagram DVSt 1309-240
- (7) Storer I } See circuit diagram CVSt 1313-147
- (8) Storer II }
- (9) Synchronization Intensifier, see circuit diagram DVSt 1309-202
- (10) Controlling Section, see circuit diagram CVSt 1313-145
- (11,12,13,14) Boxes to take connection cables and spare parts for set.

The wiring of the frame may be seen in wiring diagram CVSt 1313-143. The external current supply for the set comes from A.C. mains, 220 volts; variations in the mains voltage of $\pm 10\%$ will still give satisfactory working. The supply of current within the set is then provided by the rectifier stages 1 - 4 as shown in fig. 1.

The 60 volt stage contains a dry rectifier unit, which provides current for the holding current circuit of the storer relays and for the current circuits of the receiver magnets in the teleprinters.

The Electronic Rectifier II is a stabilised source of current. It supplies the anode current for the oscillator valve in the synchronization intensifier, for the Reception Amplifier, not including the regulating device; further the current for the holding circuits of the two receiver relays in the Reception Amplifier; at the same time the grid voltages needed for the individual components are tapped off from the electronic rectifier II.

The Electronic Rectifier I contains two independent rectifiers with adequate smoothing circuits. The first rectifier supplies anode current for the last two stages in the synchronization intensifier and for the 3 valves of the regulating device in the Reception Amplifier. The second rectifier supplies anode current for the storer valves.

The 12 volt stage contains 2 separate dry rectifier units. Unit 1 supplies current for the motor driving the distributor plates and the testing transmitter in the Mechanical Section. Unit 2 supplies a carefully smoothed circuit for the rotating, magnetically working deflection system of the cathode ray oscillograph in the Mechanical Section.

The Mechanical Section. A motor installed in this section drives via a transmission gear the brushes for 2 distributor plates, 1 testing transmitter and the magnetically working deflection system for the cathode ray oscillograph. Current for the cathode ray valve is supplied from the so-called high voltage rectifier which is housed over the valve. Also installed in the mechanical section are the filter elements for the distributor plates, further the storer valve common to both the storers and the armature and field resistances necessary to regulate the speed of the motor. In fig. 2 the screen of the cathode ray valve can be seen at 1. At point 2 the brightness of the moving spot is regulated, and at point 3 its sharpness. Switch 4 enables the motor to be switched on or off. Knob 5 regulates the speed of rotation of the machine, to ensure local synchronous running.

The Reception Amplifier with regulating device. The two units are electrically separate. The regulating device works in conjunction with the rotating distributor in the Mechanical Section and has effect only on the Synchronization Intensifier. The Reception Amplifier is a 2-stage amplifier with limiting end stage working from the lower bend of the characteristic. In the anode current circuit of the last valve are 2 polarised relays, the t/p relay and the oscillograph relay. The regulating device contains 3 polarised relays, each one of which is actuated by a valve. The grids of these valves are controlled by 3 contact segments on one of the distributor plates in the mechanical section. By switching in the above mentioned 3 relays, which work with their contact surfaces on the oscillator in the synchronization intensifier, it is possible to alter the frequency as desired, i.e. to regulate it. The reception amplifier possesses - in Fig. 3 at 1 - a meter switch to check the valves of the reception amplifier, of the regulating device and of the synchronization intensifier. Knob 2 regulates the input voltage. 3 is the connection box to receive the w/t receiver to be connected. A pair of headphones for listening can be connected at 4.

The Storer. Set 1313 has two storers. As already mentioned each message is allotted a storer, in order to adjust the telegraphic speed of the teleprinters to that of the transmitter which is to be received. Each individual impulse of the 5-impulse combination is held on the so-called impulse relays of the storer. There are 5 impulse relays in each storer. Each relay has two windings, the exciter winding and the holding winding. Further there are two relays, each of which has its winding in the anode current circuit of a valve assigned to it. The first relay has the function of starting up the teleprinter connected to the storer; this it does when its appropriate valve has received a short grid impulse from the distributor. The teleprinter then contacts the impulse relays of the storer in succession, with the aid of its transmitter which has been adapted for this purpose. Hence in each case according to the state of the storer relays the correct letter is printed. When the transmitter shaft in the teleprinter has made one revolution it automatically locks itself. Before the next letter can be printed the lock must be disengaged by an impulse sent to the starting valve and to the teleprinter's start relay and coupling magnet. The second relay has the function, after its valve has received a short grid impulse from the distributor, of restoring the storer to a neutral state, i.e. to make it ready to store up a new set of impulses. This always occurs after the teleprinter has printed a character. As in Fig. 4, 1 the storer has a meter switch on its front plate. By means of this switch and of a meter in the controlling section of the set, the exciter and holding currents of the impulse relays and also the valves for the starter and neutralising relays can be observed. The tumbler switch 2 is provided for the reception of cipher transmissions. When these are being received the switch must be in the position "Constant Start - On" ["Dauerstart-Ein"].

The Synchronization Intensifier secures local synchronous running, i.e. between the oscillator frequency of the synchronization intensifier and the frequency given by the generator unit of the driving machine in the mechanical section. Accordingly then the synchronization intensifier possesses an oscillator. The frequency produced in the oscillator can be altered within the limits of about 500 - 1000 cycles. This range corresponds to a locally synchronisable range of rotation speed of the distributor brushes of about 150 - 245 r.p.m. As the energy output from the oscillator is not sufficiently powerful to synchronize the driving mechanism, a final push-pull stage is provided, coupled to the oscillator via a coupling stage. The A.C. output from the synchronization intensifier amounts to about 10 watts. Alteration of synchronising frequency is effected by means of knobs 1 and 2 in Fig. 5. Knob 1 gives fine adjustment and knob 2 coarse adjustment of the synchronising frequency. The tumbler switch 3 is used to ensure that the set is in correct phase. The 4 valves are observed by the measuring switch in the reception amplifier.

The Controlling Section. In general, this contains the parts which are operated for the working. Also installed in the Controlling Section is a transformer providing the heater current for all valves of the set. Referring to Fig. 6, 1 is a meter to measure the mains voltage. When the main switch 2 is switched off this instrument shows the mains voltage. The main switch 2 switches all the current supply units, i.e. the whole set, on or off. It has been found necessary to be able to switch the storers on or off at will; this is afforded by tumbler switches 3 and 4. Each of these switches has a pilot lamp (5 and 6) which indicates the state of working of the appropriate storer. Tumbler switch 7 is a selective meter switch. When it is turned upwards, meter 8 indicates the currents which are to be observed in storer 1.

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By altering the rotary switch on the front plate of storer 1, all the currents given on the scale of the above mentioned switch can be observed. When switch 7 is in the mid position the currents given on the rotary switch scale of the reception amplifier can be observed. When switch 7 is turned downwards the currents of storer 2 can be observed. Tumbler switch 9 when operated isolates the reception amplifier from the distributor plate, i.e. signals coming in from the transmitter cannot reach the distributor and consequently are not printed. This isolation is particularly desirable when short periods of interference blur the signals from the transmitter. When such interference has ceased switch 9 is placed from the position "T/P Ready" ["TS-berett"] into the position "T/P-On" ["TS-ein"], and the set immediately causes the incoming signals to be printed again. Switch 10 is used when regulating local synchronous running. The cathode ray tube in the mechanical section affords an indication of local synchronous running. Local synchronous running is attained by regulating the driving machine by the control knob "Local synchronous running" ["Lokaler Gleichlauf"] in the mechanical section. The position of switch 11 depends on the kind of working of the transmitter which is to be received, i.e. either transmission current (+) or closed circuit current (-). The middle position of the switch makes it possible to test the set by means of a testing text which is produced inside the set and is fed into the reception amplifier in place of the text from outside. In this way the whole of the set may be tested.

All incoming and outgoing connections are placed at the rear of the set. These are: the mains connection, earth wire for the set, modulation connection, 2 T/P mains lines and 2 T/P control lines.

Now that a short survey of the individual working parts has been given, the set's operation will be explained in the next section.

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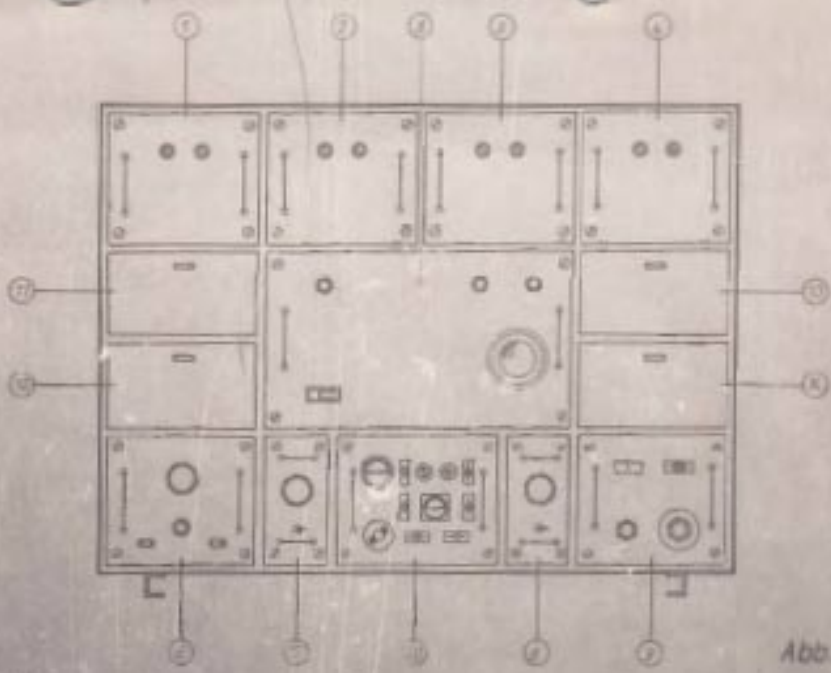


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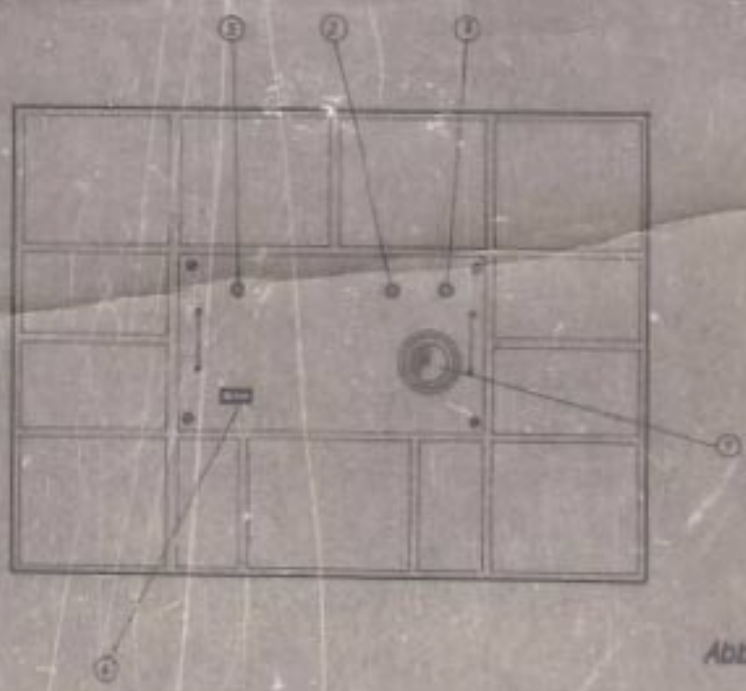


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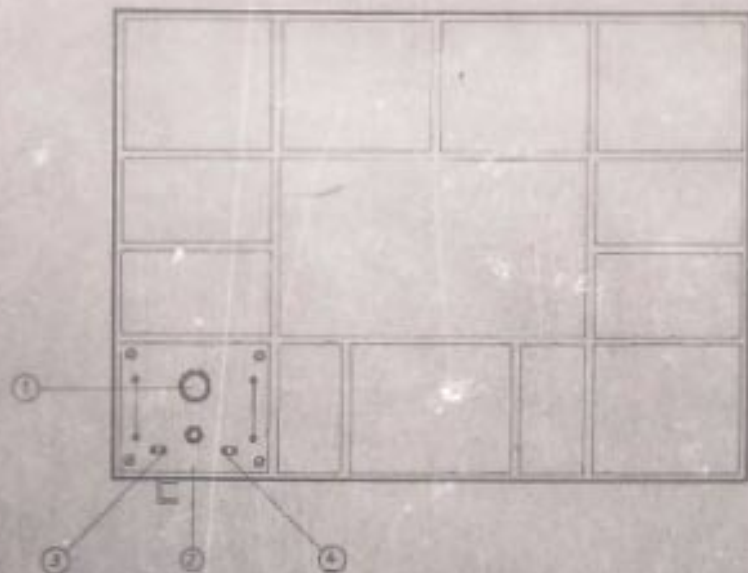


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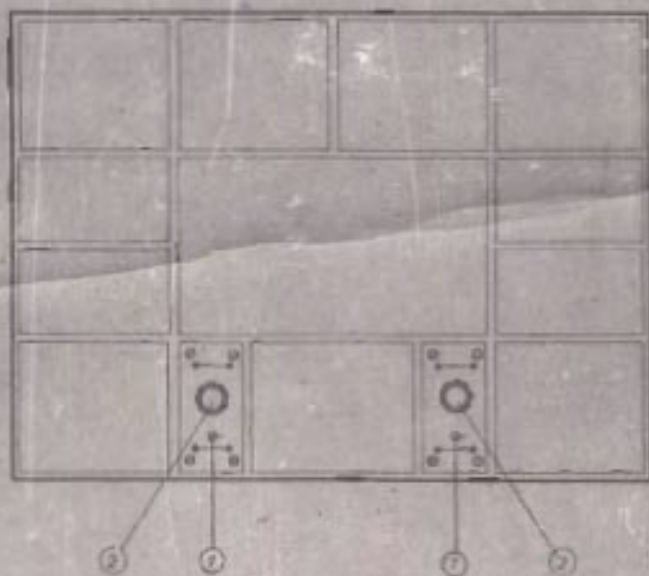


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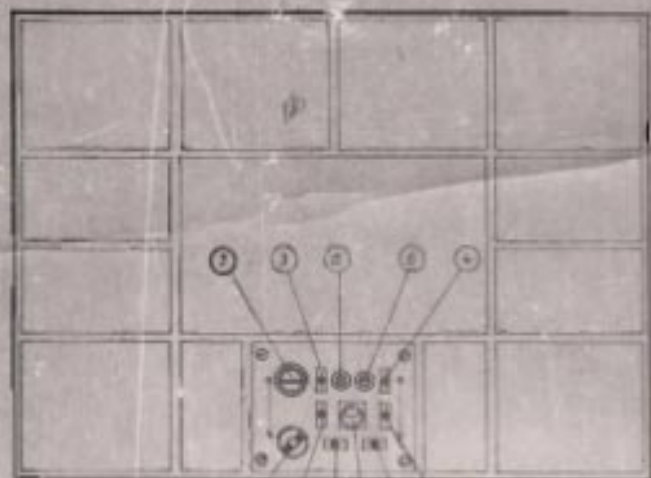


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II. Principle of Set 1313

As shown in Fig. 7 the signals transmitted by wireless 1 are fed via the aerial 2 to the radio receiver 3. In the diagram the succession of impulses has been marked as they occur in the A 2 working. Thus we have, reading from the right, at 1 the phase signal (blue) which is important for the synchronous running, in correct phase, of the transmission mechanism. It consists, as we already know, of 2 steps of equal duration, the first step being an impulse, the second being a blank space. This phase signal of 2 steps is followed by the two groups of five impulses of the two messages being transmitted. The impulses of message I are marked in red, those of message II in green. After this the procedure repeats itself. These impulses thus arrive at the radio receiver 3. They leave it on an audio-frequency carrier wave in the manner shown in 4 and are fed to an amplifier with a maximum-value limiter 5. Here the indicators are amplified, rectified and limited. They finally excite two relays connected in series. Each relay forms the beginning of a new current circuit (6 and 7), the result being that the same processes take place in each current circuit (see 8 and 9). The signals are now no longer A.C. but D.C. signals, and are led via line 6 to the distributor mechanism to be evaluated, and the impulses of circuit 7 to a cathode ray tube to be made visible. The distributor mechanism is driven by a motor 10, which is so arranged that it can be synchronized via current 11 by an A/F generator with output amplifier 12, that is, the adjustable audio frequency at 12 determines the number of revolutions of the motor 10 and keeps it very constant over a long period. The motor 10 drives the distributor shaft 14 via a transmission gear 13; the shaft carries the brushholders 15 and 16, which stroke their brushes over segments of the stationary distributor plates 17 and 18. The shaft 14 also drives the magnetically working deflection system 19 of the cathode ray tube 20. This cathode ray tube is particularly important as by its means the most essential functions of the set can be made visible and watched.

The A 2 system is a synchronous telegraphic system. This means in the present case that shaft 14 requires the same time to make one revolution as does the distributor shaft of the distant transmitter. This alone, however, is not sufficient, insofar as the distributor brushes 15 and 16 must also be in correct phase with the distributor brushes of the distant transmitter. These two essential requirements are easily attained with the help of the cathode ray tube. In the first place, there is a "local synchronous running". As the term expresses it, two operations have to be carried out at the same rate. The unit for determining the rate in set 1313 is the audio-generator 12 with coupled output stage, and the working unit which has to adjust itself to the given rate is the motor 10. Thus through the output 11 the motor is compelled to follow the rate, as the so-called synchronising frequency is fed to the A.C. section of the motor. The motor is not always in local synchronous running with this, and the number of revolutions of the machine must be adjusted on the D.C. side until it corresponds with the imposed frequency. The cathode ray tube is used in this adjustment for observation. In the controlling section of the set is a switch "local synchronous running" ["Örtlicher Gleichlauf"] which when operated applies the current circuit 11 to the magnetically working deflection system of the cathode ray tube. This switch is not given in Fig. 7; an exact description with full details of the circuit will be given in the subsequent section. The trace-forms on the screen of the cathode ray tube vary according to the state of local synchronous running. Fig. 7a shows the trace-form of a set which is not in local synchronous running. A difference between the

frequency coming from the local rate detector 12 and the frequency produced by the motor produces a series of beats in current circuit 11. The motor revolutions must therefore be altered until a picture as in Fig. 7b is obtained. In the case as shown there the synchronising frequency coming from the audio-generator 12 is equal to the frequency produced by the motor. Any slight change in the frequency coming from audio-generator 12 will obviously cause an alteration in the speed of revolution of the motor and hence in that of shaft 14. Hence it is necessary for the audio-generator 12 to produce a very stable frequency. It is now an easy matter to ascertain the speed of revolution of the distant transmitter. Accordingly a frequency corresponding to the speed of revolution ascertained is set at 12. It is quite possible, of course, that this frequency will later have to be readjusted. Whether this is necessary or not will be ascertained when the impulses 9 coming through line 7 reach the deflection system 19, as shown in Fig. 7. The trace-form represented in 20 will then occur on the screen. As is already known, a phase signal is sent by the transmitter after every revolution of the distributor shaft. This signal, in the same way as any other signal, will appear in the picture on the screen. In the majority of cases, after the first setting of the synchronising frequency, which will be followed by local synchronous running, the phase signal in the trace-form will move to the right or the left. The frequency fine-adjustment is now used to alter the frequency until the phase signal always appears in the same place. When this has been attained, the speed of revolution of the distributor shaft 14 is identical with that of the distant transmitter. The state of affairs was, as mentioned above, the first essential requirement for working. By looking carefully at the picture on the cathode ray tube screen a very high and narrow blip 21 can be seen. This blip serves to adjust to the correct phase relationship. The second essential requirement for working will be obtained when the phase signal is in a certain definite position relative to the blip 21, and in fact it should appear as shown at 20. The distance of the phase impulse from the blip 21 should correspond to the breadth of the phase impulse, hence the distances a and b in 20 should be equal to each other. By manipulating a switch in the synchronization intensifier the phase signal is turned into the position shown in trace picture at 20, which has just been described above as the second essential requirement for working.

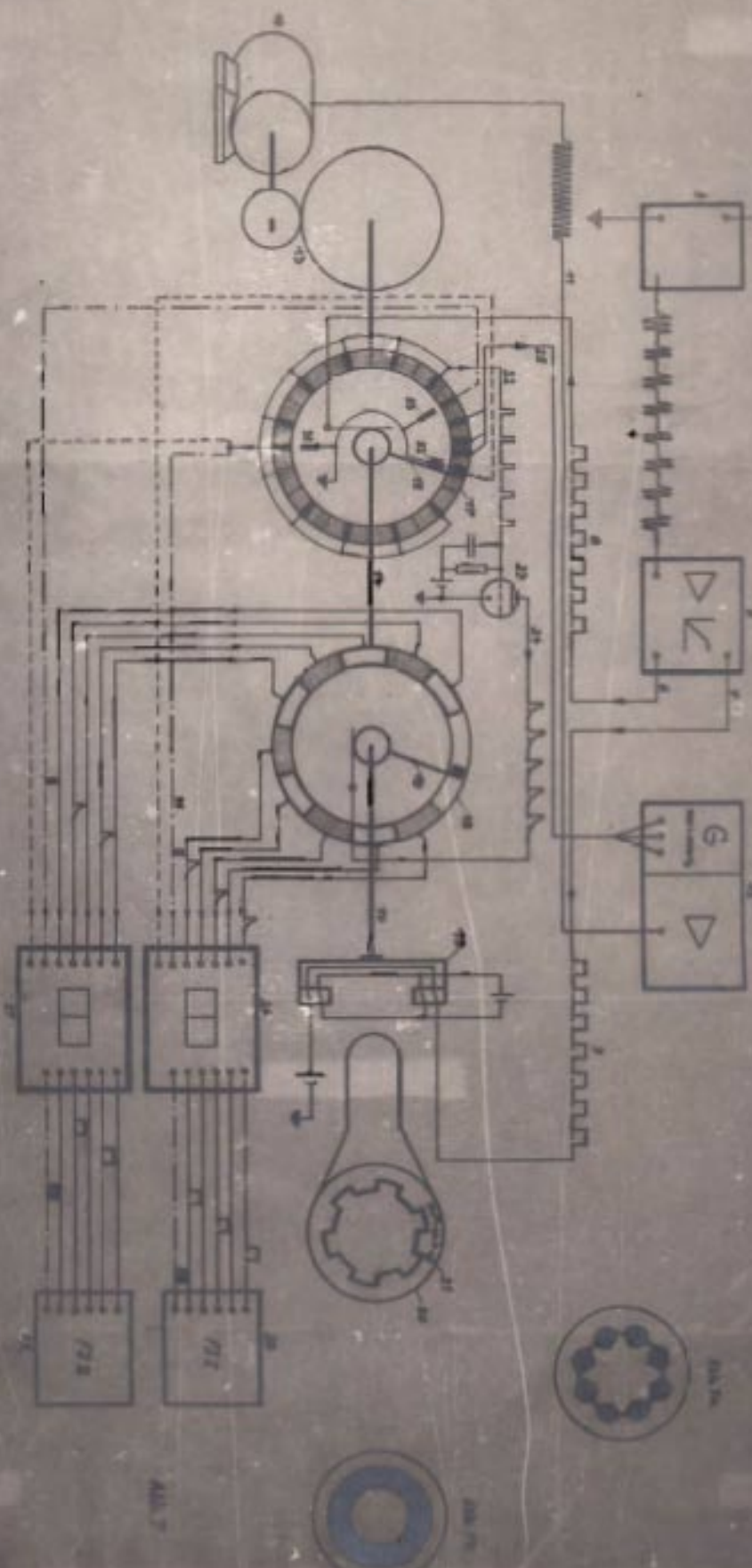
When the set is running synchronously and in correct phase with the distant transmitter, we may proceed to the recording of the incoming message transmissions. The signals 8 coming in via line 6 are led via brushes 15 to a distributor plate 17. Here the impulses of message I go on to the red field, those of message II on to the green field and the two-step phase signal on to the blue field. From each incoming impulse of the message transmissions only a small part (Mittenabstastung) is taken via wire 22 to the grid of a valve 23. When the grid is receiving no impulse potential, no current can pass through the valve. Only when an impulse arrives on the grid can the valve pass current. As a condenser-resistance device is incorporated in valve 23's grid circuit, the signals are lengthened and leave valve 23 in the way shown in line 24. Via this line the impulses arrive via brush 16 to the actual distributor plate 18. The impulses of message I are distributed within the red field, those of message II within the green field. The phase signal does not need to be distributed; it has already been used on plate 17 to control the audio-frequency generator 12 via wire 25. This control procedure, called regulation, is designed to smooth out small and sudden variations in the rate of revolution having their cause in the distant transmitter or in set 1313. Accordingly, only the impulses of messages I and II arrive at distributor 18. The wires connected to the individual segments of this distributor lead to Storers

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14.

26 and 27. Each message has a storer assigned to it. Here the impulse pattern of the message transmission is stored up and, activated by an impulse which is produced on distributor plate 17, the teleprinters 28 and 29 print the character corresponding to the stored-up impulse pattern. Thus teleprinter 28 prints message I and teleprinter 29 records message II. We will now describe this procedure for message I: after the lengthened impulses (red) have passed from distributor plate 18 via the segment wires to the storer relays at 26 and have excited the relays there, and immediately the fifth impulse of the 5-impulse group has been distributed, a further impulse is produced on impulse plate 17 at 30; this impulse runs through the storer via line 31 and causes the teleprinter 28 to start up. The teleprinter 28 now takes in as rectangular impulses the impulses stored up in the storer 26, evaluates them and prints them. This completes the process except that now a process must take place to put back the relays in storer 26 so that the following symbol of message I can be stored. This so-called discharging of the storer occurs as the result of an impulse which likewise comes from impulse plate 17. The discharge impulse is produced at 32 and is sent to storer 26 via line 33. In the period between the sending of the starting impulse at 30 and of the discharge impulse at 32 the teleprinter 28 has "emptied" the storer 26. Within this period distributor 17, working in conjunction with distributor 18, has stored up in storer 27 a symbol of message II. The starting impulse for message II has been produced on impulse plate 17 at 39 for teleprinter 29, and at 30 its corresponding storer has been discharged again and made ready to receive the next symbol of message II. This process now repeats itself for each letter, figure or symbol of both message I and message II.

The next section of description explains the wiring diagram with all its details, including those which have been disregarded here for the sake of simplification.



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III. Mode of working of Set 1313

(Complete description of current-paths).

In the incoming circuit from the radio receiver is a choke-condenser arrangement to prevent interference from the set into the receiver. The impulses arrive first in the controlling section at switch U 42. When the switch is in the upward or downward position the impulses are sent as input to the reception amplifier. The amplitudes of the impulses can be regulated by a potentiometer before they pass through two resistance-coupled amplifier stages. Full-wave Delong rectification is used, which doubles the voltage. The grid of the final valve which follows is given so large a negative bias that practically no anode current flows. If the rectified amplitudes now produce a voltage which reduces the applied grid bias to the grid voltage which permits the valve to work (about 0 volts), anode current flows and the telegraph relays lying in the anode circuit are excited. If the voltage created is so great that positive grid bias arises, the working point of the valve shifts to the upper bend of the characteristic. This arrangement thus has a limiting effect. In the anode circuit are the two telegraph relays R 16 and R 17 (oscillograph relay and reception relay) in series. Hence they work simultaneously. The second winding of these relays is a holding winding. The resistances connected in parallel to these windings serve to maintain the prescribed working values of the relays. From the diagram it can be seen that the relay contacts r 16 and r 17 are at nil potential. Hence from this point on every "current step" ["stromschritt"] appears as a nil potential, as the relays work according to "current steps" occurring in the course of the message transmissions. The impulse combinations of the message transmissions are split by the two relays into two separate channels. The one channel (from the oscillograph relay R 16) leads to the cathode ray tube which serves for observation and adjustment. The other channel (from the reception relay R 17) finally ends at the teleprinters. As can be seen in the diagram, the meter in the controlling section is connected by means of a switch to the individual current circuits for the supervision of the working of the valve and relay circuits in the reception amplifier (measurement of drop in potential). These two channels lead back from the relays to switch U 42 in the controlling section. The telegraphic impulses from the transmitter which is to be received can be sent by "current for mark" or "current for space" procedure. As however the message transmissions will only be dealt with in the set in "current for mark" system, we must be able to change "current for space" transmissions into "current for mark" ones. This is done by switch U 42. How this is effected can be clearly seen from the diagram. The switch has 3 positions, "+", "Test" ["Prüfen"], and "-". In the "test" position the impulses delivered by the receiver are switched off from the reception amplifier and the testing transmitter switched in instead. The procedure "Test" will be described lower down.

We shall now first of all follow up the channel (from R 17) which leads to the teleprinters. From switch U 42 it goes on, via the out-out switch U 44. ("Ready" - "On" ["Bereit" - "Ein"]) which enables the circuit to be broken, to the impulse plate in the mechanical section. In the diagram the impulse plate is represented as a flattened out strip. It has copper segments on both the left and the right side. A pair of brushes runs over both sides and connects each segment on the left with the corresponding segment on the right. The telegraphic impulses arrive at segments on the left lying opposite to segments 1a - 5a and 1b - 5b on the right side. These segments correspond to the two sets of 5 "current" or "no current" elements for each

letter or symbol of the two message transmissions. When the speed of revolution of the brushes is the same as the transmitter speed (synchronism) the brush is always on a segment when a "current" or "no current" element is being sent. Hence the first impulse of message transmission I must arrive at segment 1a, the second impulse of message transmission I at 2a and so on; then the five impulses of message transmission II similarly at the segments 1b - 5b (phase synchronism). The setting to phase synchronism will be described further down. The segments 1a - 5a and 1b - 5b are all connected one with the other and lead to the valve R5 51. The grid bias of this valve is so negative that practically no anode current can flow. As now every "current element" appears as a nil potential, the grid bias of the valve becomes nil volts at the incidence of every "current element", and anode current flows. The "current elements" now appear as intensified current pulses and are led to the left-hand side of the distributor plate. As before, both sides are represented as flattened out strips, over which rotates a pair of brushes synchronous and equal in phase to the pair of brushes of the impulse plate. The left-hand side of the distributor plate consists of a closed copper ring. The right-hand side has two sets of five segments which correspond in position to the segments 1a - 5a and 1b - 5b of the impulse plate. They are designated $a_1 - a_5$ and $b_1 - b_5$. The segments $a_1 - a_5$ lead individually to storer 1, the segments $b_1 - b_5$ to storer 2. As the brushes of the impulse plate run synchronously with the brushes of the distributor plate, they also are always in this case too in contact with a segment at the moment when a "current" or "no-current" element is being sent in the course of the message transmission. Thus the distributor plate separates the individual impulses of one message transmission from those of the other - provided that there is synchronism of phase and speed of revolution with the transmitter - and leads them via the storers to the two teleprinters. The choke-condensator arrangement introduced into each line acts as interference filter.

In the storer each impulse created by a "current" element goes via the distributor plate ($a_1 - a_5$ or $b_1 - b_5$) and causes one of the impulse relays (R 1 - 5) to work. It can be seen from the diagram that each relay, once closed, is automatically held closed by its second winding (holding winding). The chokes, resistances and condensators inserted here are also used for spark quenching and filtering. If now a letter or symbol of the message transmission has been held in the five relays of the storer, the teleprinter when reading off [abtasten] the storer finds closed current circuits through the closed relays corresponding to "current" steps. The teleprinter is caused to read off by the start impulse; this originates on the right-hand side of the impulse plate. Here are two segments designated S_1 and S_2 , each coming after their respective impulse segments 1a - 5a and 1b - 5b. Opposite them on the left-hand side are segments which carry nil potential. In the diagram the current path from segment S_2 to storer 2 can be followed. In storer 2 the path goes via the relay contact r 9/I or via the switch U 50 to the grid of valve R5 6. Here the grid bias is again so high that practically no anode current flows. If the pair of brushes of the impulse plate touch the starting segment S_2 , the grid of valve R5 6 receives nil potential and anode current flows.

The relay R 6 in the anode circuit closes. The contact r 6/I switches on + 60 volts to the coupling magnets in the teleprinter, the transmitter axle makes a turn and activates the transmitter contacts by cams. The teleprinter differs from those in normal T/P networks in that it has its sending contacts individually wired to the storer, in which the current circuits are either closed or open according to the letter stored up, and thus the reception magnet in the teleprinter receives either current or no current from the teleprinter transmitter, and from this combination the type to be printed is selected. When this process has been completed the storer must be discharged again to be ready for the next letter. As before, this is done from the impulse plate. On the righthand side of the impulse plate are two further segments L₁ and L₂. Opposite them are segments at nil potential. The path from discharge segment L₂ to storer 2 will be followed in the diagram. In the storer it goes via relay contact r 9/II or via the switch U 50 to the valve R5 8, which has the same negative grid bias as the starting valve R5 6. When the pair of brushes of the impulse plate contact the discharge segment, the grid potential of valve R5 8 becomes nil, anode current flows and relay R 8 closes. The 5 relay contacts of this relay cut off the current supplies to each of the holding windings of the impulse relays R 1 - 5. These relays are discharged, fall open, and the storer is ready for a new storing. The valve and relay current circuits are as before connected by means of a switch to the meter in the controlling section, where they can be observed. In addition, the working voltages for the teleprinters are supplied via the storers. These are switched on from the controlling section by switches U 45 and U 46, the storer and the teleprinter being switched off when relay R 10 is switched on. Glow-lamps G1 22 and G1 23 act as indicators. The current supply to the holding windings of the impulse relays R 1 - 5 first runs through the coil of relay R 9. The contacts r 9/I and r 9/II switch on the starting and discharging segments to the grids of their respective valves. Hence a start or stop impulse cannot be effective until at least one impulse of the 5-impulse group has been stored up, as not until then does relay R 9 close. In certain transmission procedures it is necessary for the starting impulses to be sent through at regular intervals independent of any storage. For this purpose switch U 50 is pushed over, thereby bridging the contacts of relay R 9.

The channel coming from the oscillograph relay R 16 goes from the switch U 42 in the controlling section firstly to switch U 43, by operation of which it can be broken, and from there to the mechanical section, where it arrives at the deflection system of the CR tube. The deflection system consists of 4 coils lying on a common annular core. This rotates around the CR tube synchronously with the plate brushes. As can be seen from the diagram, two coils of the deflection system, connected in parallel, receive a constant D.C. voltage from the 12 volt stage, this voltage being particularly well filtered there for the purpose. When the system rotates, a circle appears on the screen of the CR tube. The diameter of the circle is adjustable by the resistance W 326. These coils are supplied with current via the brushes B 55 and B 57.

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The other two coils, connected in series, receive via resistance W 327 and then via brushes B 56 the impulses from the Reception Amplifier. As the current elements have nil potential, the second pair of coils causes a further deflection of the electronic beam. "Current" elements appear on the screen as rectangular projections from the original circle. The height of the projection depends on the setting of the resistance W 327. The synchronisation signal sent at regular intervals in the message transmissions must of necessity be visible on the screen and may occur at first at any place on the screen picture. When we have synchronism with the transmitter the synchronisation signal appears always in the same place. When we have phase equivalence, i.e. the impulses of both message transmissions are actually arriving at the correct segments of the impulse and distributor plates, the synchronisation signal appears at a definite place on the screen. This place is marked by the "limiting mark" ["Begrenzungszeichen"]. This mark also originates on the right-hand side of the impulse plate, where there is a segment B, opposite which on the left-hand side is a segment receiving nil potential via switch U 43 in the controlling section. The segment B leads to the resistance W 327. When the brushes of the impulse plate contact the segment B, resistance W 327 is given nil potential, i.e. it is partially short-circuited, as can be seen from the diagram. Thereupon the voltage rises, and on the screen picture appears an additional projection (the limiting mark) for such time as the impulse plate brushes are in contact with segment B.

The driving motor consists of two parts: the shunt-wired D.C. motor and the A.F. generator. The armature current can be observed on the meter in the controlling section by operating a switch in the reception amplifier. (Potential drop at resistance W 330). The motor drives the brushes of the deflection system plates and those of the testing transmitter via a transmission gear. The frequency required for synchronisation is taken from the Synchronisation Intensifier. As can be seen from the diagram the Synchronisation Intensifier has a coarse adjustment for setting the frequency, consisting of a step switch which can switch fixed capacities in or out. These are in series with the capacities C 112 and C 101. A variable condenser is provided for fine adjustment. The primary winding of the transformer U 5 is used as inductance. The frequency is pre-amplified in a second valve and is then fed to a push-pull final stage, whence it is led to the motor in the mechanical section. The individual current circuits of the valves are connected for testing purposes to the meter in the controlling section by switches installed in the reception amplifier.

In the Synchronisation Intensifier are two further switches U 4 and U 5 for obtaining synchronism of phase. By working switch U 4 the capacity C 112, which is normally connected in series, is short-circuited. This lowers the frequency and reduces the motor's speed; in the screen picture the synchronisation signal moves to the left. When switch U 5 is operated capacity C 101 is added in series with capacity C 112 and the capacities already

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20.

installed. The frequency becomes greater, the motor speed rises, and the synchronisation signal moves to the right. The switches are operated until the synchronisation signal has moved to the marked position. So that variations of the rotation speed may be automatically smoothed out, a further arrangement is provided, by means of which it is possible for the frequency of the synchronisation intensifier and thereby the speed of revolution of the motor to be influenced directly by the synchronisation signal from the distant transmitter. On the right-hand side of the impulse plate at the bottom are 3 further segments F, V and R. Opposite then is a segment which receives the telegraphic signals from the reception amplifier in the form of nil potential. The three segments correspond to three valves R5 18 - R5 20, which are in the regulating device in the reception amplifier. The grid bias applied is again so negative that anode current is practically nil. When one of the segments receives nil potential via the brushes, the grid potential of the valve corresponding to the segment drops to nil. The relays lying in the anode circuits of the valves close and alter the capacity of the oscillatory circuit in the synchronisation intensifier. When synchronisation has been achieved, the "current" element of the synchronisation signal falls within the period when segments F and V are being contacted by the brushes. In this case contacts r 18/I and r 19/I close. This alters nothing, as contact r 19/I merely supplements contact r 18/I. If all three segments are contacted, capacity C 112, which is connected in series, is short-circuited. This is effected by contact r 20/I via contact r 18/I. Thus if segment R is being contacted in addition to the two others the motor is running too fast, and the momentary increase in capacity slows it up a little. If the motor is running too slowly and hence only segment F is being contacted during the "current" element, the capacity C 104, which is normally short-circuited, becomes effective through the closing of contact r 18/I; the frequency is momentarily increased and the motor thereby accelerated. The anode circuits of the three valves are as before connected via switch to the meter in the controlling section for observation purposes. There is yet another plate in the mechanical section: the testing transmitter. It serves to test the whole apparatus including the teleprinter without the receiver. In the diagram the testing transmitter is represented as a flattened-out strip. The left-hand side consists of a closed copper ring, the right-hand side of copper segments of equal size alternating with segments of insulating material also equal in size. The copper segments are connected with the copper ring. Brushes slide over both sides. The segment side receives via the brush the frequency from the synchronisation intensifier. From the left-hand side the frequency which has now been keyed [getastet] goes to switch U 42 in the controlling section. The number of segments on the right-hand side at the given number of rotations produce a combination of impulses which causes teleprinter 1 to write the letter Y, teleprinter 2 the letter R. When switch U 42 is placed in the middle position ("Test" ["Prüfen"]) the impulses of the testing transmitter, which are short-circuited at positions "+" and "-", are switched in to the reception amplifier. Resistance W 324 reduces the impulse potential to the desired input potential of the reception amplifier.

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21.

The switch U 41 in the Controlling Section, which is marked "Örtlicher Gleichlauf" serves to check the local synchronous running. We understand by this term synchronism of the motor with the frequency at which it actually should run, this frequency being produced by the Synchronization Intensifier. When switch U 41 is operated all impulses are switched off from the channel leading to the CRT. In their place the CRT receives the frequency from the Synchronisation Intensifier and the frequency delivered by the A.F. generator of the driving motor. From the picture which appears on the screen as a result of mixing these two frequencies the state of local synchronous running can be ascertained. In the Controlling Section is a power transformer supplying filament voltages for the various valves. The filament wirings and the power lines for 220 volts A.C. (supply lines) and the meter connection lines are not indicated in the diagram.

Instructions for Operating Set 1313.

Before the set is connected to the local power supply of 220 volts A.C., care should be taken to see that the automatic fuses at the rear of the set are switched out. Furthermore the main switch 2 in Fig. 6 should be at "Aus". When the set has been earthed and it has been connected to the local power supply by the cable provided, the type of power supply should be checked by means of the glow-lamp "Spannungsart" ["type of voltage"] at the rear of the set. Both electrodes of the glow-lamp should light up. If only one electrode lights up the power supply is D.C. and cannot be used for working the set. When the type of power supply has been ascertained both automatic fuses are switched in and the mains voltage checked at meter 1 in fig. 6. It should be 220 volts A.C. $\pm 10\%$. When the above conditions have been fulfilled the set is ready for working.

The following instructions are to be carried out when operating the set:

1. Tune in the distant transmitter in the radio receiver till clear reception is obtained, of small signal strength and as free from interference as possible.
2. Ascertain type of traffic (+ or -) and speed of revolution of distant transmitter by the usual means.
3. Place switch 11 in fig. 6 to the type of traffic ascertained.
4. Set in at knob 3 of fig. 5 approximately the synchronising frequency corresponding to the speed of revolution of the distant transmitter ascertained. The fine adjustment will be carried out later.
5. Place switch 3 (storer 1) as in fig. 6 at "Aus", similarly switch 4 (storer 2).
6. Place switch 9 at "PS-bereit".
7. Place switch 7 in the horizontal position.
8. Place switch 4 in fig. 2 to "Motor - Aus".
9. Turn back input amplitude by means of potentiometer 2 in fig. 3.
10. Switch on set by switch 2 in fig. 6 and wait till it has warmed up (2 mins.).
11. By control knobs 2 and 3 in fig. 2 adjust sharpness and brightness of spot of light on CRT screen. Too bright a spot shortens the life of the tube, so make spot only just as bright as necessary.
12. Place switch 4 in fig. 2 to "Motor - Ein".
13. Observe local synchronous running at the CRT by operating switch 10 in fig. 6 and regulate it by means of control knob 5 in fig. 2.

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23.

14. Increase input amplitude by potentiometer 2 in fig. 3 until satisfactory signals are visible on screen of CRT.
15. Further regulate synchronising frequency at 1 in fig. 5 until synchronisation signal appears always at the same place in the picture. It should not move.
16. With the aid of switch 2 in fig. 5 bring the set into correct phase.
17. Place switch 9 in fig. 6 at "FS-Ein".
18. When local synchronous running and correct phase have been attained, turn rotary switch 1 in fig. 3 to position "K". The needle of meter 8 in fig. 6 must be only on the red field; this is attained by knob 5 in fig. 2. During this operation the local synchronous running should be observed at the CRT.
19. According to the state of traffic, switch on the storers 1 and 2 via switches 3 and 4.
20. Switch 1 in the storers, as shown in fig. 4, should be placed to "Dauerstart-Aus". In any case special orders regarding this will be given.
21. During traffic constantly observe at the CRT the state of reception in the receiver, the set's local synchronous running and its phase.
22. During momentary periods of heavy interference of reception place switch 9 in fig. 6 to "FS-Bereit", but immediately return it to "FS-Ein" and observe para. 21.
23. If it is suspected that the teleprinters are not printing correctly, then test whole set by means of switch 11 in fig. 6. Place this switch at position "Prüfen". Then, when potentiometer 2 in fig. 3 has been fully turned up, machine 1 will print the letter "Y" and machine 2 the letter "R".
24. Only specialist personnel may rectify any faults which may occur.

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24.

WEIGHTS AND DIMENSIONSWeights:

Frame of set without components	72 kg
Mechanical section	20.5 "
12 volt stage	20.5 "
60 volt stage	17.5 "
4 wooden boxes with cable	15 "
Electronic rectifier I	15 "
Two storers	12 "
Electronic rectifier II	11.5 "
Synchronisation intensifier	10 "
Reception amplifier	9.5 "
Controlling section	<u>7 "</u>
Total weight of set	210.5 kg
Weight of transporting crate	<u>92 "</u>
Total weight of Set 1313 packed for transport:	<u><u>302.5 kg</u></u>

Dimensions of transporting crate:

Height: 960 mm
 Width: 1545 mm
 Depth: 625 mm

Current consumption when working from 220 volts A.C. mains

$i_N = \text{ca. } 4 \text{ amp.}$

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25.

<u>em number</u>	<u>name</u>	<u>diagram reference and specification</u>
1	Frame	
2	Mechanical section	BVSt 1313-146
3	Receiving and regulating device	DVSt 1309-240
4	Synchronization intensifier	DVSt 1309-202
5	Storer 1	CVSt 1313-147
6	Storer 2	CVSt 1313-147
7	Electronic reo- tifier 1	EVSt 1309-200
8	Electronic reo- tifier 2	EVSt 1309-201
9	12 Volt Stage	EVSt 1309-778
10	60 Volt Stage	EVSt 1309-203
11	Controlling Section	BVSt 1313-145
12	Plate for connections on the right consisting of:	
	a) Socket (Bu 159)	ZO 4871
	b) Socket (Bu 160)	ZO 4871
	c) Socket (Bu 157)	EO 148 774
	d) Socket (Bu 153)	EO 148 774
	e) Socket (Bu 161)	Sk 574 920/IV
	f) Short circuiting switch 220	EV 1309-276 complete
	g) Counterbalance (Bu 164)	EO 76 804
	h) 3 condensers, C335-337	25000 μ F 250 V
	i) 2 double chokes, D225-226	EO 111 014 L = 0,78 mH \pm 20 %
13	Plate for connections on the left consisting of :	
	a) Automatic fusing	(Si 51) Pd ABG PL NR. 286 200 250V 6A
	b) " "	(Si 52) " " " "

BVSt 1313-148
Gesamtschaltbild

SECRET

26.

<u>Item number</u>	<u>name</u>	<u>Maker's designation and specification</u>
	o) Plug board set	(St162) Sk 680 381
	d) Socket (Bu 163)	ZO 4871
	e) Glow lamp (Gi 21)	Prössler BS 40
	f) Glow lamp holder	EV 1309-459
	g) Resistance (W 299)	Da 10000 Ohm 5 DIN 41403
	h) " (W 300)	" " "
	i) Mounting plate for (g) and (h)	
14	12-point spring contact strip	(BU 36) Rel ale 34b
15	same as 28	(Bu 37)
16	same as 28	(Bu 41)
17	same as 28	(Bu 42)
18	same as 28	(Bu 43)
19	same as 28	(Bu 35)
20	same as 28	(Bu 31)
21	same as 28	(Bu 32)
22	same as 28	(Bu 33)
23	same as 28	(Bu 1/2)
24	same as 28	(Bu 11/2)
25	same as 28	(Bu 21/2)
26	same as 28	(Bu 1/1)
27	same as 28	(Bu 11/1)
28	same as 28	(Bu 21/1)
29	same as 28	(Bu 151)
30	same as 28	(Bu 152)
31	same as 28	(Bu 153)
32	same as 28	(Bu 154)
33	30 point spring contact strip	(Bu 155) Rel ale 37b
34	same as 47	(Bu 156)

BVSt 1313-148
Gesamtschaltbild

NOTE:

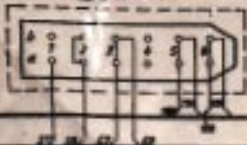
("Same as 28" appears to mean "Same as 14", and
"Same as 47" appears to mean "Same as 33".)

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7373

12 Volt - Stufe EYST 1309-778

Bu 47

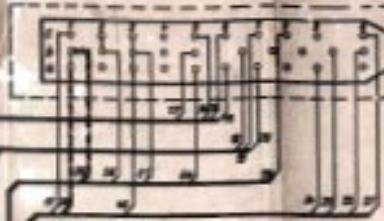


Röhrengleichrichter EYST 1309-200

Bu 37



Mechanikteil EYST 1313-196

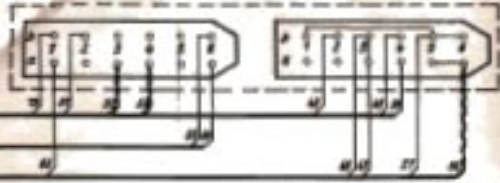


Bu 155

Synchronisierungsverstärker EYST 1309-203

Bu 34

Bu 35

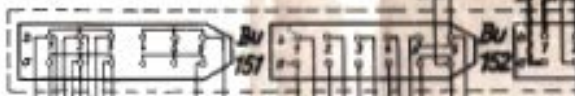


Bu 1/2

Speicher I
EYST 1313-147



Befehlstell EYST 1313-145

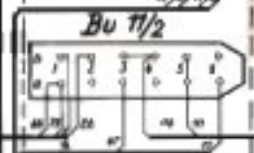


Bu 157

Bu 152



Bu 160



Bu 1 1/2



Bu 2 1/2



Bu 163

St 162



G 27

EVST 1309-200

Röhrengerichtiger II EVST 1309-201

60 Volt-Stufe EVST 1309-202

Bu 36

Bu 42

Mechanikteil BVST 1313-196

Bu 155

Bu 156

Bu 161

Regel u. Empfangsverstärker

Bu 31

Bu 32

Bu 1/1

Speicher I
CVST 1313-747

Leuchtteil BVST 1313-745

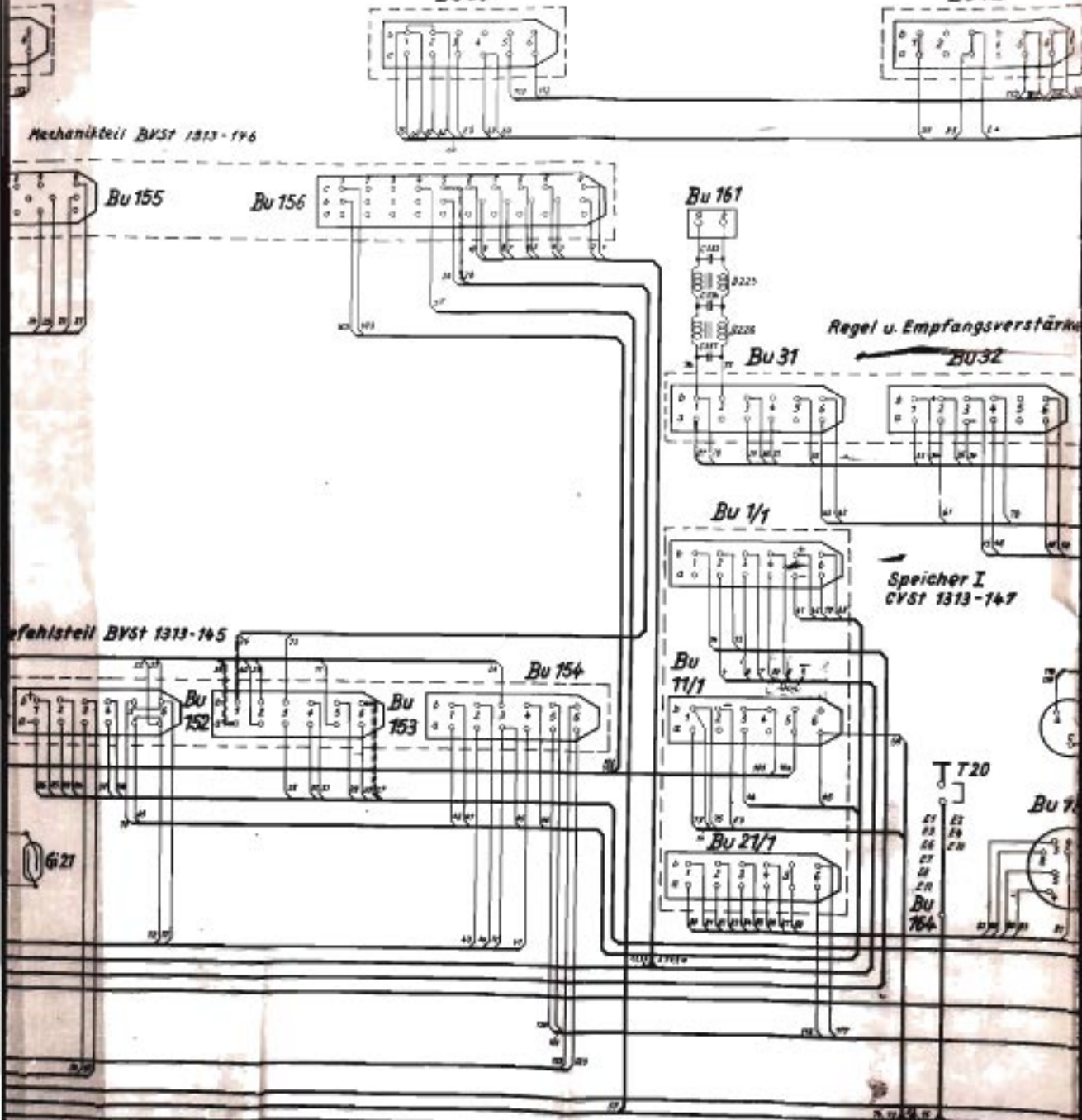
Bu 154

Bu 11/1

Bu 21/1

T 20

Bu 7



Date		By	

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By **W NARA** Date **11/9/12**

60 Volt-Stufe **EVSt 1303-203**

Bu 42

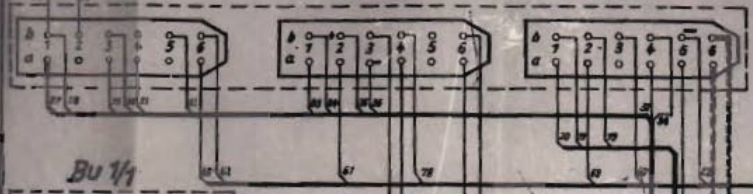


Regel u. Empfangsverstärker **BVSt 1303-240**

Bu 31

Bu 32

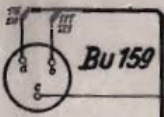
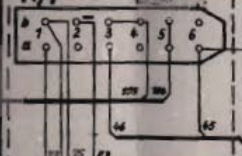
Bu 33



Bu 1/1

Speicher I
CVSt 1313-147

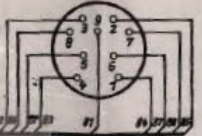
Bu 11/1



Bu 157

T T20

ET
E3
E4
E5
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E7
E8
E9
BU
764



Bitte überlegen Sie sich die Beschriftung. Überprüfen Sie die Richtigkeit der Beschriftung vor dem Einbau.		3		30.10.1947	
Wichtig! Halten Sie unbedingt an diesen Anweisungen fest!		2		20.10.1947	
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		99		10.10.1947	
		100		10.10.1947	



Gesamtschaltbild

	From Bu	To Bu	Wire Specification and gauge	Wire No.	From Bu	To Bu	Wire Specification and gauge
	156 c 0	1/2 a 2	0,5	25	156 b 5	153 b 3	0,5
2	156 b 0	1/2 b 3	0,5	26	156 c 5	153 b 1	0,5 MV226 b
3	156 b 9	1/2 a 3	0,5	27	31 a 1	153 b 6	0,5 MV226 b
4	156 c 9	1/2 b 4	0,5	28	31 b 1	153 a 3	0,5
5	156 b 8	1/2 a 4	0,5	29	31 a 3	153 b 5	0,5
6	156 c 8	1/1 a 2	0,5	30	31 b 3	153 a 6	0,5
7	156 b 7	1/1 b 3	0,5	31	31 a 4	153 a 4	0,5
8	156 c 7	1/1 a 3	0,5	32	31 b 5	153 b 4	0,5
9	156 b 6	1/1 b 4	0,5	33	32 a 1	152 a 2	0,8)
10	156 c 6	1/1 a 4	0,5	34	32 b 1	152 b 2	0,8)
11	155 c 1	153 a 5	0,5	35	32 b 2	152 b 1	0,5
12	154 a 3	11/2 a 6	0,5	36	32 a 3	152 a 1	0,5
13	32 b 3	34 b 1	0,5	37	33 a 4	152 a 4	0,8)
14	155 c 5	1/1 b 1	0,5	38	33 b 4	152 b 4	0,8)
15	155 a 6	1/1 b 2	0,5	39	155 a, b 1	153 a 1	0,5 MV226 b
16	155 c 6	1/2 b 1	0,5	40	155 a, b, c 3	153 a 2	1,5
17	155 b 5	1/2 b 2	0,5	41	154 b 1	1/1 a 5	0,5
18	155 b 6	33 b 2	0,5	42	154 a 1	1/1 b 5	0,5
19	155 c 7	33 b 1	0,5	43	154 a 2	1/2 b 5	0,5
20	155 a 7	33 a 1	0,5	44	154 b 2	1/2 a 5	0,5
21	155 c 0	152 b 5, 6	0,8)	45	154 a 3	11/1a, b 6	0,5
22	155 b 0	152 a 5, 6	0,8)	46	154 b 4	11/1 a 3	0,5
23	155 b 9	153 b 2	0,5	47	154 a 4	11/2 a 3	0,5
24	155 a 9	154 b 3	0,5	48	32 a 4	35 b 2	0,5

BVSt 1313-148

Legeplan zum Gesamtschaltbild

SECRET

31.

Wire No.	From Bu	To Bu	Wire Specification and gauge	Wire No.	From Bu	To Bu	Wire Specification and gauge
49	32 a 6	35 b 4	0,5	73	11/1 a 1	11/2 a 1	0,5
50	32 b 6	35 a 4	0,5	74	11/1 b 1	11/2 b 1	0,5
51	33 a 5	34 b 2	0,5	75	11/2 b 1	36 b 1,2	0,5
52	33 a 6	34 a 3	0,5 MV226 b	76	31 b 1	via 161a	0,5 MV226 b
53	33 b 6	34 a 4	0,5 MV226 b	77	31 b 2	choke-unit 161b	0,5 MV226 b
54	34 a 6	152 a 3	0,8	78	155 o 8	32 b 4	0,5
55	34 b 6	152 b 3	0,8	79			
56	155 a, b 1	35 a 5,6	0,5 MV226 b	80	21/1 a 1	157 5	0,5
57	156 o 4	41 a 1	0,5	81	21/1 b 1	157 9	0,5
58	41 a, b 2	155 b, c 2	1,5	82	21/1 a 2	157 3	0,5
59	42 a, b 1	11/1 a 6	0,5	83	21/1 b 2	157 4	0,5
60	33 b 3	36 a 1	0,5	84	21/1 a 3	157 1	0,5
61	32 a 2	36 b 1,2	0,5	85	21/1 b 3	157 2	0,5
62	31 b 6	36 a 2	0,5	86	21/1 a 4	157 8	0,5
63	31 a 6	36 a, b 4	0,5	87	21/1 b 4	157 6	0,5
64	36 b 1,2	155 a 5	0,5	88	21/1 b 5	157 7	1,5
65	36 a 4	34 a 1	0,5	89			
66	37 a 1	11/2 a 1	0,5	90	21/2 a 1	158 5	0,5
67	35 a, b 3	37 a 4	0,5	91	21/2 b 1	158 9	0,5
68	33 a 2	35 a, b 3	0,5	92	21/2 a 2	158 3	0,5
69	152 b 5,6	1/1 b 6	0,8	93	21/2 b 2	158 4	0,5
70	152 a 5,6	1/1 a 6	0,8	94	21/2 a 3	158 1	0,5
71	152 b 5,6	1/2 b 6	0,8	95	21/2 b 3	158 2	0,5
72	152 a 5,6	1/2 a 6	0,8	96	21/2 a 4	158 8	0,5

BVST 1313-148

Legeplan zum Gesamtschaltbild

SECRET

	From Bu	To Bu	Wire Specification and gauge	Wire No.	From Bu	To Bu	Wire Specification and gauge
	21/2 b 4	158 6	0,5	121	159 b	154 a 5	0,8)
98	21/2 b 5	158 7	1,5	122	160 a	154 b 6	0,8)
99				123	160 b	154 a 6	0,8)
100	162 a	151b,4,5,6	1,5)	124	162 a	163 a	1,5)
101	162 b	151a,4,5,6	1,5)	125	162 b	163 b	1,5)
102	151b 1,2,3	156 c 1	0,8)	126	st 162 a	st 51	1,5)
103	151a 1,2,3	156 b 1	0,8)	127	st 162 b	st 52	1,5)
104	151b 1,2,3	11/1 a,b 5	0,8)				
105	151a 1,2,3	11/1 b 4	0,8)	Wire No.	From Bu	To Earth	Wire Specification and gauge
106	151 b1,2,3	42 a,b 6	0,8)	E1	155 a,b,c3	"	1.5
107	151 a1,2,3	42 a,b 5	0,8)	E2	33 b 5	"	1.5
108	151 b1,2,3	41 a,b 5	0,8)	E3	11/1 b 2	"	1.5
109	151 a1,2,3	41 a,b 6	0,8)	E4	42 a b 3	"	1.5
110	151 b1,2,3	11/2 b 4	0,8)	E6	11/2 b 2	"	1.5
111	151 a1,2,3	11/2 a,b5	0,8)	E7	35 b 5,6	"	1.5
112	42 a,b 6	36 a,b 6	0,8)	E8	41 ab 3	"	1.5
113	42 a,b 5	36 a,b 5	0,8)	E10	159 c	"	1.5
114	41 a,b 5	37 a,b 5	0,8)	E11	160 c	"	1.5
115	41 a,b 6	37 a,b 6	0,8)	E12	162 c	163 c	1.5
116	21/1 b 6	159 a	0,8)	E5	42 ab 3	36 ab 3	1.5
117	21/1 a 6	159 b	0,8)	E9	41 ab 2	37 a 2	1.5
118	21/2 b 6	160 a	0,8)	All wire specifications not indicated are MV 226 a.			
119	21/2 a 6	160 b	0,8)	} Pairs bracketed are twisted together.			
120	159 a	154 b 5	0,8)				

number of items	name and description	maker's designation and specification
1	Condensor	Lorenz KA 10564 B 2 μ F Working voltage 120
1	Condensor	Lorenz KA 10093 B 1 μ F Working voltage 250
043	1 Condensor	Same as C ₁ 2.
044	1 Condensor	Lorenz KA 10811 A 25000 μ F Working voltage 250
045	1 Condensor	Same as C ₄ 1
046	1 Condensor	Same as C ₄ 2
047	1 Condensor	Lorenz KA 10809 A 10000 μ F Working voltage 250
048	1 Condensor	Lorenz KA 10808 A 5000 μ F Working voltage 250
049	1 Condensor	Same as C ₄ 8
050	1 Condensor	Same as C ₄ 7
051	1 Condensor	Same as C ₄ 1
052	1 Condensor	Lorenz KA 10091 B 2x0.5 μ F Working voltage 120 Connected in parallel as 1 μ F
053	1 Condensor	Same as C ₄ 4
054	1 Condensor	0.5 μ F 120V
055	1 Condensor to replace C ₅ 4 and C ₅ 5	Same as C ₅ 4
1	Condensor	Lorenz KA 0094B 2x0.5 μ F 120V

DVSt 1309-240

Empfangeverstärker und
Regeleinrichtung.

	number of items	name and description	maker's designation and specification
	1	Condensor	Lorenz KA 10812 A 50000 $\mu\mu\text{F}$ Working voltage 250
057	1	Condensor	Same as C56
C58	1	Condensor	Same as C47
C59	1	Condensor	Same as C47
C60	1	Condensor	Lorenz KA 10313 1 μF Working voltage 160
C61	1	Condensor	Same as C60
C62	1	Condensor	Same as C60
C63	1	Condensor	Lorenz KA 10490A 2 μF Working voltage 500
C64	1	Condensor	Same as C63
C65	1	Condensor	Same as C63
D16	1	High frequency choke	Sk 851 581/II 0.32 mHy 240 turns 1.5 ohms
D17	1	High frequency choke	Same as D16
D18	1	High frequency choke	Same as D16
D19	1	High frequency choke	Same as D16
R16	1	Relay	Trls 54b Bv 4/726
R17	1	Relay	Same as R16
R18	1	Relay	Trls 43a TBv 4/317

DVSt 1309-240

Empfangsverstärker und
Regelinrichtung.

Diagram number	number of items	name and description	maker's designation and specification
19	1	Relay	Same as R18
20	1	Relay	Same as R18
R810	1	Vacuum tube	EV 12 P 2000
R811	1	Vacuum tube	Same as R811
R812	1	Vacuum tube	Same as R811
R813	1	Vacuum tube	Same as R811
R814	1	Vacuum tube	Same as R811
R815	1	Vacuum tube	Same as R811
St31	1	12-point contact strip	Rel ale 34a
St32	1	12-point contact strip	Same as St31
St33	1	12-point contact strip	Same as St31
T2	1	Short-circuiting plug	EV 1309-276
U2	1	Supply and anode current testing switch	DV 1309-557
U1	1	Transformer	Sk 627 031/XVI Prim.: 1900 turns 0.08 copper wire Sec.: 11000 turns 0.08 copper wire
U2	1	Transformer	Sk 627 031/XVI Prim.: 4000 turns 0.08 copper wire Sec.: 8000 turns 0.08 copper wire
V11	1	Rectifier element	Siemens Sirutor 15b

DVSt 1309-240

Empfangsverstärker und
Regelrichtung.

Item number	number of items	name and description	maker's designation and specification
	1	Rectifier element	Same as Vi 1
	1	Rectifier element	Same as Vi 1
	1	Rectifier element	Same as Vi 1
Vi5	1	Rectifier element	Same as Vi 1
Vi6	1	Rectifier element	Same as Vi 1
W71	1	Fixed resistance	Da 300 ohms 5DIN41401
W72	1	Fixed resistance	Da 50000 ohms 5DIN 41401
W73	1	Fixed resistance	Da 10000 ohms 5DIN41403
W74	1	Fixed resistance	Same as W72
W75	1	Fixed resistance	Da 200 ohms 5DIN41401
W76	1	Fixed resistance	Same as W75
W77	1	Fixed resistance	Da 2000 ohms 5DIN41403
W78	1	Fixed resistance	Same as W77
W79	1	Fixed resistance	Da 1000 ohms 5DIN41403
W80	1	Fixed resistance	Same as W77
W81	1	Fixed resistance	Same as W77
W82	1	Fixed resistance	Same as W79
W83	1	Fixed resistance	Da 300000 ohms 5DIN41401
W84	1	Fixed resistance	Da 500000 ohms 5DIN41401

DVSt 1309-240

Empfangsverstärker und
Regleinrichtung.

<u>Diagram number</u>	<u>number of items</u>	<u>name and description</u>	<u>maker's designation and specification</u>
W85	1	Fixed resistance	Da 100000 ohms 5DIN41401
W86	1	Fixed resistance	Da 1 M ohms 5DIN41403
W87	1	Fixed resistance	Same as W86
W88	1	Fixed resistance	Da 5000 ohms 5DIN41403
W89	1	Fixed resistance	Same as W77
W90	1	Fixed resistance	Same as W79
W91	1	Fixed resistance	Same as W77
W92	1	Fixed resistance	Same as W77
W93	1	Fixed resistance	Same as W77
W94	1	Fixed resistance	Same as W77
W95	1	Fixed resistance	Same as W77
W96	1	Fixed resistance	Same as W77
W97	1	Fixed resistance	Same as W79
W98	1	Fixed resistance	Da 800 ohms 5DIN41401
W99	1	Fixed resistance	Same as W98
W100	1	Fixed resistance	Da 10000 ohms 5DIN41403
W101	1	Fixed resistance	Da 400000 ohms 5DIN41403
W102	1	Fixed resistance	Da 100000 ohms 5DIN41403
W103	1	Fixed resistance	Da 500000 ohms 5DIN41403

DVSt 1309-240

Empfangsverstärker und
Regelinrichtung.

number of items	name and description	maker's designation and specification
1	Fixed resistance	Same as W102
W105	1 Fixed resistance	Da 500000 ohms 5DIN41403
W106	1 Fixed resistance	Same as W102
W107	1 Fixed resistance	Da 8000ohms 5DIN41401
W108	1 Fixed resistance	Da 100 ohms 5DIN41403
W108a	1 Fixed resistance	Same as W108
W109	1 Fixed resistance	Same as W108
W109a	1 Fixed resistance	Same as W108
W110	1 Fixed resistance	Da 50000 ohms 5DIN41403
W111	1 Fixed resistance	Da 500 ohms 5DIN41401
W112	1 Fixed resistance	Same as W110
W113	1 Fixed resistance	Same as W111
W114	1 Fixed resistance	Same as W110
W115	1 Fixed resistance	Same as W111
W116	1 Wire resistance	300 ohms, with tapping clip. 13 mm. diameter, 46 mm long.
W117	1 Wire resistance	Same as W116
W118	1 Potentiometer	250000 ohms log.
Bu91	1 Socket	SK 574920/IV
Bu92	1 Socket	Same as Bu91
W303	1 Fixed resistance	Da 2000 ohms 5DIN41401

DVSt 1309-240

Empfangsverstärker und
Regelinrichtung.

DECLASSIFIED

Authority *NW32355*

By *CVNARA* Date *11/11/02*



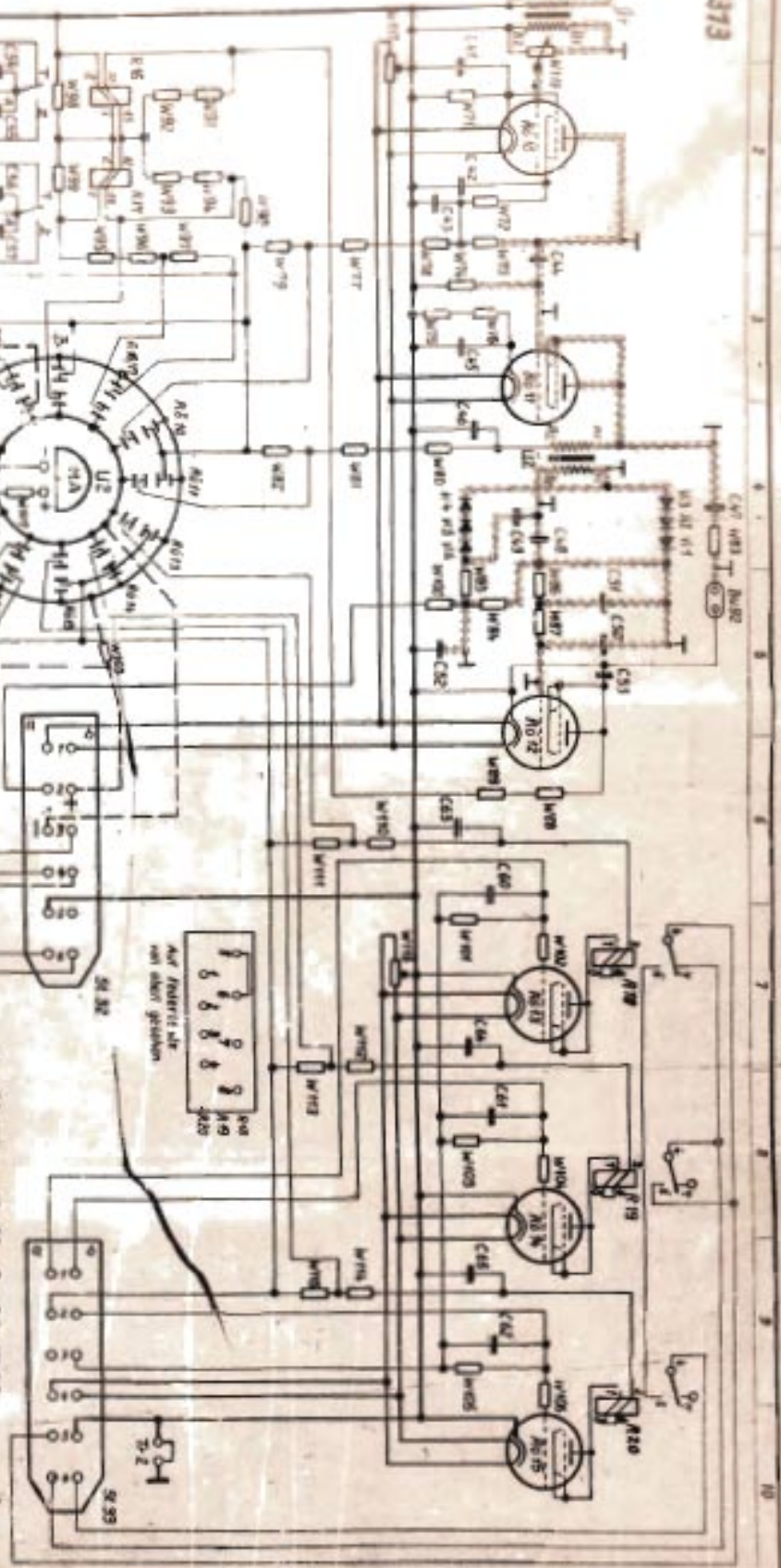
Auf Lötseite gesehen

Werkstoff		Material	
1
2
3
4
5
6

1
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1
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Rosführung I: für Gerät 1309
Rosführung II: für Gerät 1313 geschriebene Lsg.
ein Messschalter



<u>number</u>	<u>name</u>	<u>maker's designation and specification</u>
	Condensor	Lorenz KA10811 25000 uuF 250 Working voltage $-40^{\circ} + 70^{\circ}\text{C}$
	Condensor	Same as 1
C 9	Condensor	Lorenz KA 10095 120 working voltage 2 x 0.5 uuF (in series) = 0.25 uuF
C 12	Condensor	Lorenz KA10803A 0.1uuF 250 working voltage $-40^{\circ} + 70^{\circ}\text{C}$
C 13	Condensor	Same as C12
C 14	Condensor	Same as C12
C 15	Condensor	Same as C12
C 16	Condensor	Same as C12
C 17	Condensor	Lorenz KA10812A 50000uuF 250 working voltage $-40^{\circ} + 70^{\circ}\text{C}$
C 20	Condensor	Same as C17
C 21	Condensor	Same as C17
C 22	Condensor	Same as C17
C 23	Condensor	Same as C17
C 24	Condensor	Same as C17
C 25	Condensor	Same as C12
C 26	Condensor	Same as C12
C 27	Condensor	Lorenz KA 10243A 1 uuF 250 working voltage $-40^{\circ} - +70^{\circ}\text{C}$
C 28	Condensor	Lorenz KA 10093B 1 uuF 250 working voltage $-40^{\circ} - +70^{\circ}\text{C}$
D 1	Double choke	EO 111014 $L=0.78\text{ m H} + 20\%$ For windings in parallel, $R=3.6$ ohms $+ 20\%$ for windings in series. Tested for 1500 volts between windings and housing, 2 x 169.5 turns 0.4 copper wire
D 2	Same as D1	
D 3	Same as D1	

<u>pin number</u>	<u>NAME</u>	<u>Maker's designation and specifications</u>
	Double choke	Same as D1
	Double ch.ka	Same as D1
	Double Chok'a	Same as D1
	Choke	B0 113224 15 mH \pm 20% 525 turns. 0.1 copper wire 410ohm \pm 20%
D10	Choke	Same as D9
R1	Relay	A-contact gold and nickel for weak current
R2	Relay	Same as R1
R3	Relay	Same as R1
R4	Relay	Same as R1
R5	Relay	Same as R1
R6	Relay	Tl-rel 41K-1032 U-contact silver for weak current
R8	Relay	Tl-rel 41K-1032 6 circuit closing contacts of silver
R9	Relay	Tl-rel 41K-1049 2 working contacts gold and nickel for weak current
R10	Relay	Tl-rel 41K-1034 quadruple contact 1A silver
R06	Vacuum tube	RV 12P 2000
R08	Vacuum tube	Same as R06
W1	Fixed resistance	Da 500000ohm 5 DIN 41403
W2	"	Da 300000ohm 5 DIN 41403
W3	"	Da 100000ohm 5 Din 41403
W7	"	Same as W1
W8	"	Same as W2
W9	"	Same as W3
W25	"	Da 100 Ohm 5 DIN 41401
W27	"	Same as W25

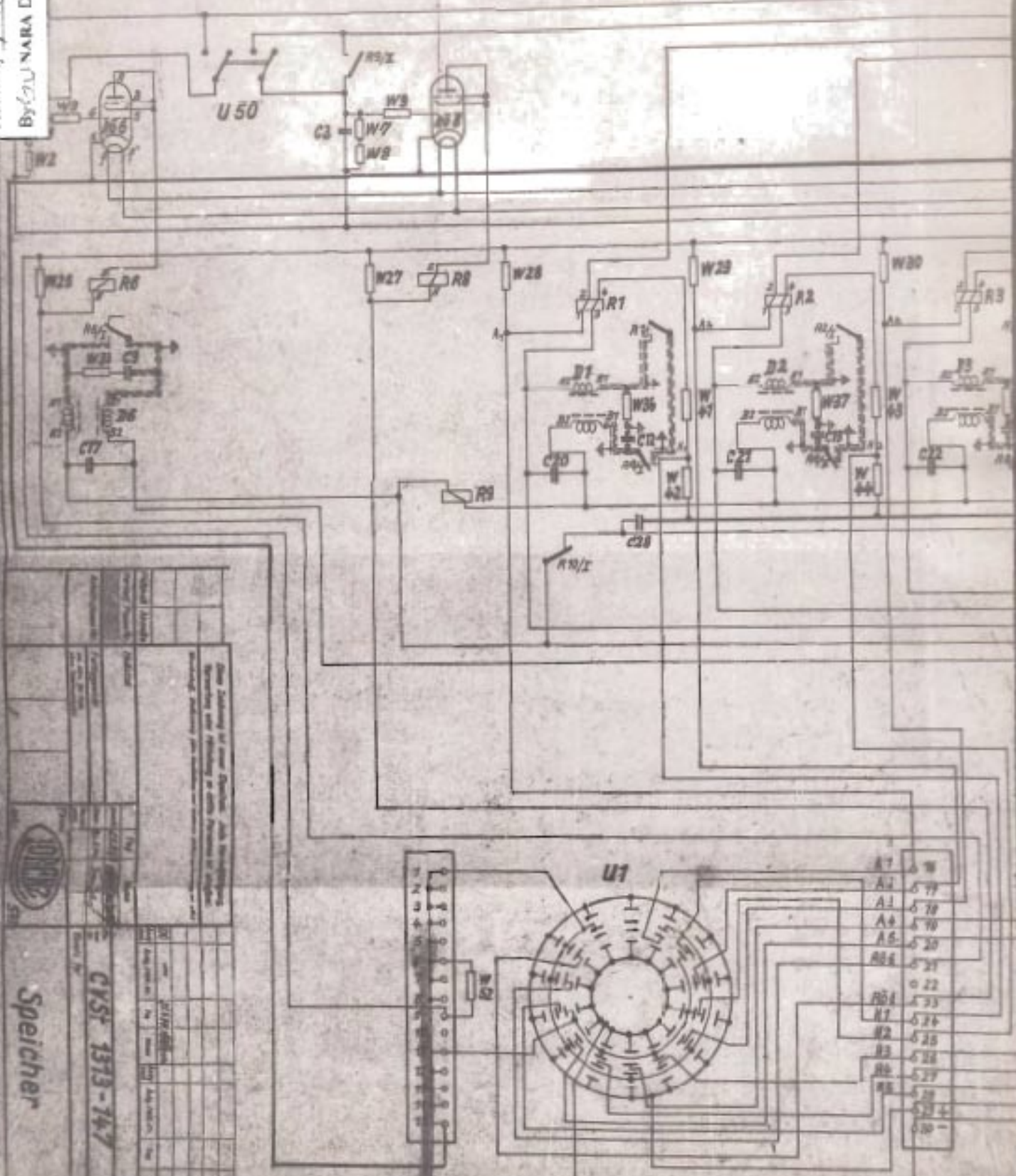
<u>item number</u>	<u>name</u>	<u>maker's designation and specifications</u>
W28	Fixed resistance	Same as W25
W29	Fixed resistance	Same as W25
W30	Fixed resistance	Same as W25
W31	Fixed resistance	Same as W25
W32	Fixed resistance	Same as W25
W33	Fixed resistance	Da 300 ohm 5 DIN 41403
W36	Fixed resistance	Da 100 ohm 5 DIN 41403
W37	Fixed resistance	Same as W36
W38	Fixed resistance	Same as W36
W39	Fixed resistance	Same as W36
W40	Fixed resistance	Same as W36
W41	Fixed resistance	Da 500 ohm 5 DIN 41403
W42	Fixed resistance	Da 200 ohm 5 DIN 41403

CV. St 1313 - 147

Speicher

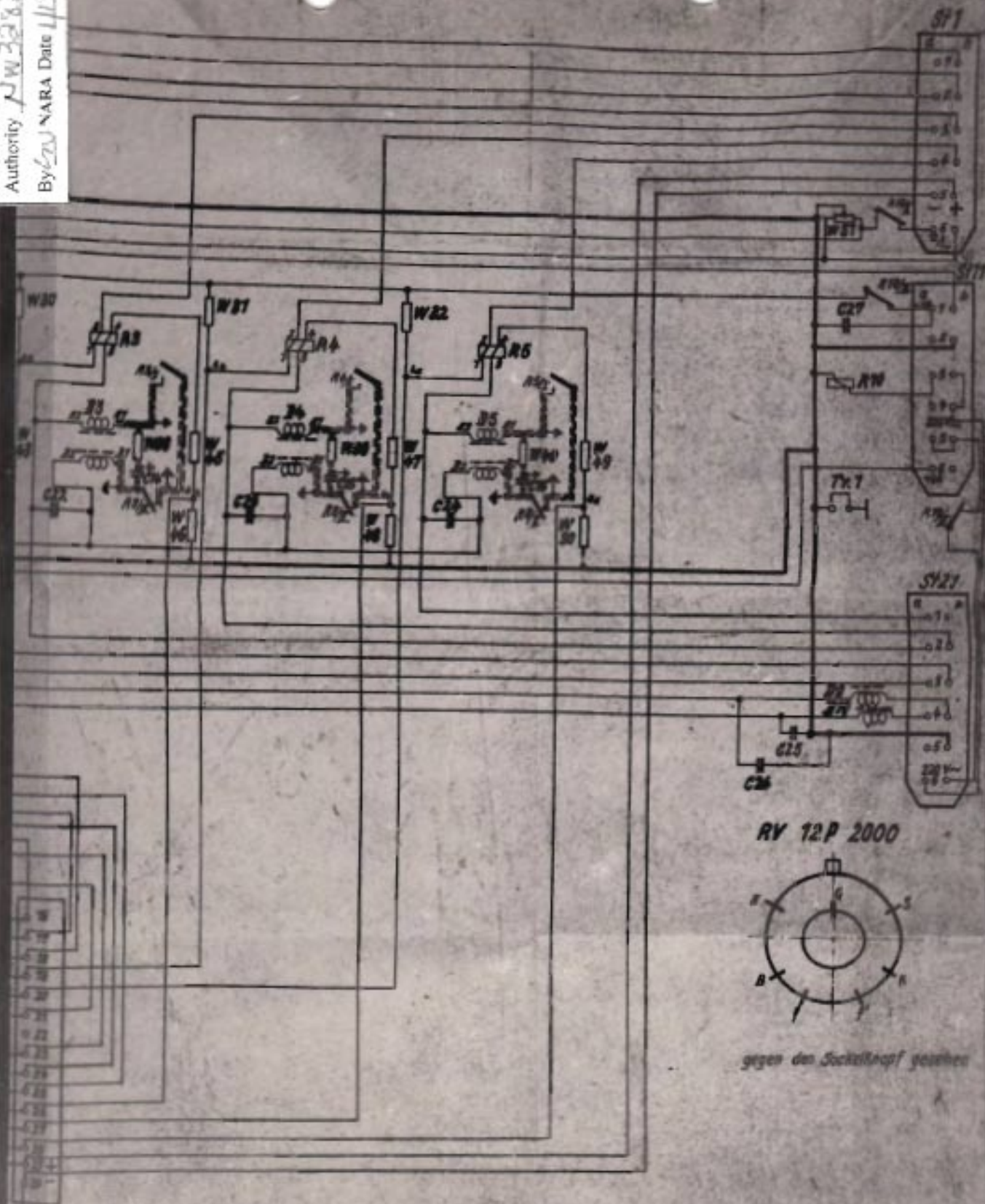
<u>number</u>	<u>name</u>	<u>maker's designation and specification</u>
3	Fixed resistance	Same as W41
W44	Fixed resistance	Same as W42
W45	Fixed resistance	Same as W41
W46	Fixed resistance	Same as W42
W47	Fixed resistance	Same as W41
W48	Fixed resistance	Same as W42
W49	Fixed resistance	Same as W41
W50	Fixed resistance	Same as W42
W51	Wire resistance	300 ohm tapped resistance (mit Abgriffschelle 13 Ø 46 lang)
W52	Fixed resistance	Da 3500 ohm 5 DIN 41401
Tr1	Overload breaker	EV 1309 - 276
U1	Metre switch	DV 1309 - 546
U50	Switch	Roka Nr. 1119
St1	12 point contact strip	Rel. ale 34a
St11	12 point contact strip	Same as St 1
St21	12 point contact strip	Same as St 1

CV.St 1313 - 147
Speicher



<p>Also See: <i>Standard of new Symbols. Also see: <u>Standard Symbols and Abbreviations for Cryptography</u>. Symbols and Abbreviations for Cryptography. Symbols and Abbreviations for Cryptography. Symbols and Abbreviations for Cryptography.</i></p>	
	<p>CYST 1373-747</p>
<p>Speicher</p>	

- A7 6 W
- A2 6 77
- A3 6 78
- A4 6 79
- A5 6 20
- A6 6 21
- 0 22
- R1 6 23
- R2 6 24
- R3 6 25
- R4 6 26
- 6 27
- 6 28
- 6 29
- 6 30



RV 12P 2000



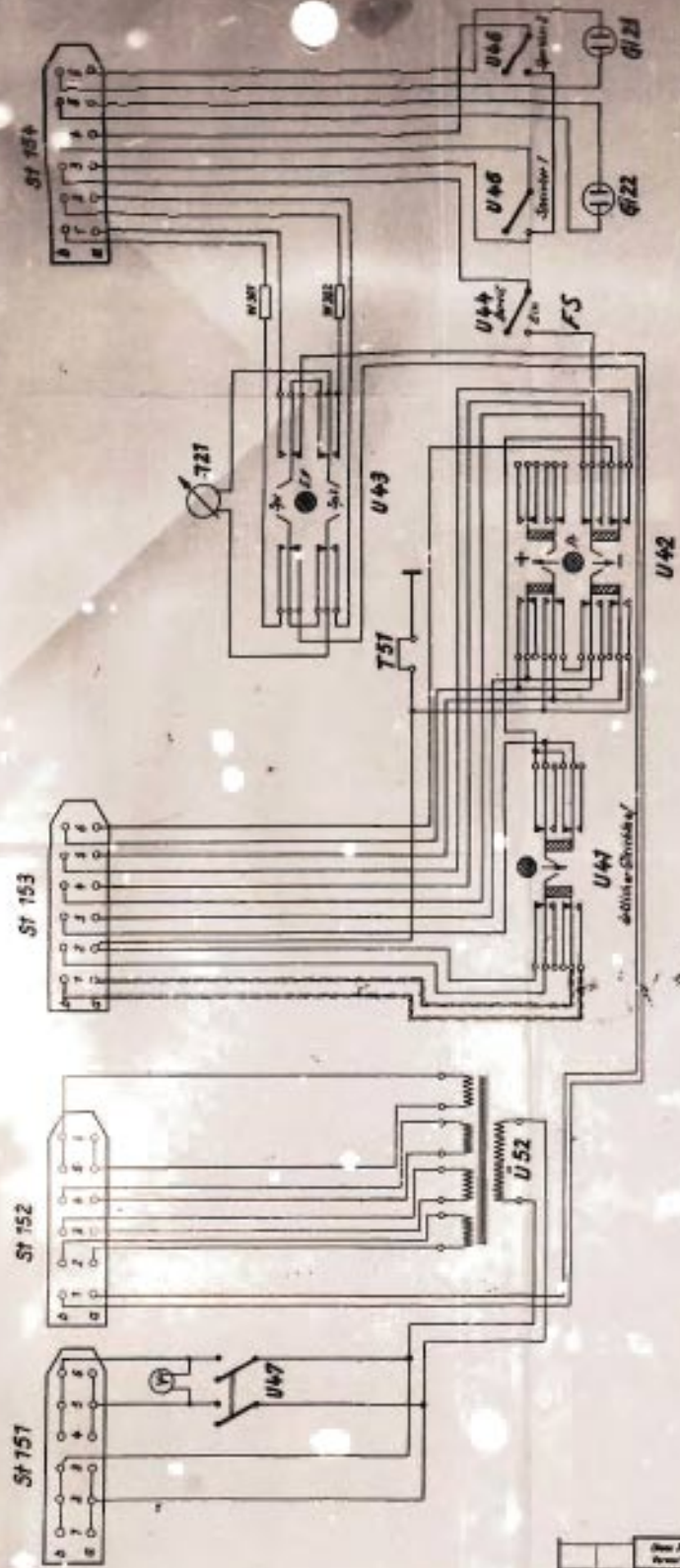
gegen den Schließknopf gesehen

DECLASSIFIED

 Authority NW32823
 By: SU NARA Date 11/2/02

SECRET

	<u>name of item</u>	<u>factory designation</u>	<u>electrical data</u>
	Glowlamp	Rafi Li.Nr. 837/220	
	Glowlamp	Same as G122	
J21	Moving coil meter	Type Pant 00 mA	0-1 mA, $\pm 10\%$ In square housing.
S151	Automatic fuse	250 V 6 Amp.	Makers AEG. PL. Nr. 286200
S152	Automatic fuse	Same as S151	
St151	12 point contact-strip	Rel ale 3A	
St152	12 point contact strip.	Same as St151	
St153	12 point contact strip	Same as St151	
St154	12 point contact strip	Same as St151	
T51	Short-circuiting plug	EV 1309-276	
U41	Tumbler switch	Rafi L.Nr. 11 VOV 3,3/ 3,3	
U42	Tumbler switch	Rafi L.Nr. 11 VVV 3,3/ 3,3/3,3/3,3	
U43	Knife-switch	Similar to our drawing SK 53341	
U44	Switch	Sk 651 371/I	
U45	Switch	Same as U44	
U46	Switch	Same as U44	
U47	Two-pole switch (Doppelpaket-schalter)	Voigt & Hüpfner 220 V 10 Amp.	
U52	Heater transformer	Prim. 220 V 50 cycles Sec.I: 12.6 V 0.3 Amps. Sec.II: 12.6 V 0.3 Amps. Sec.III: 12.6 V 2 Amps. Sec.IV: 12.6 V 1 Amp.	
V1	Moving coil meter	W Pant OV	Gossen no.1307, 250 V, 60 mm. Red mark at 220 Volts.
W301	Fixed resistance	Da 2,500 ohms 5 DIN 41401	
W302	Fixed resistance	Same as W301	



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 Beschriftung oder Mitteilung in dieser Sprache ist erforderlich.

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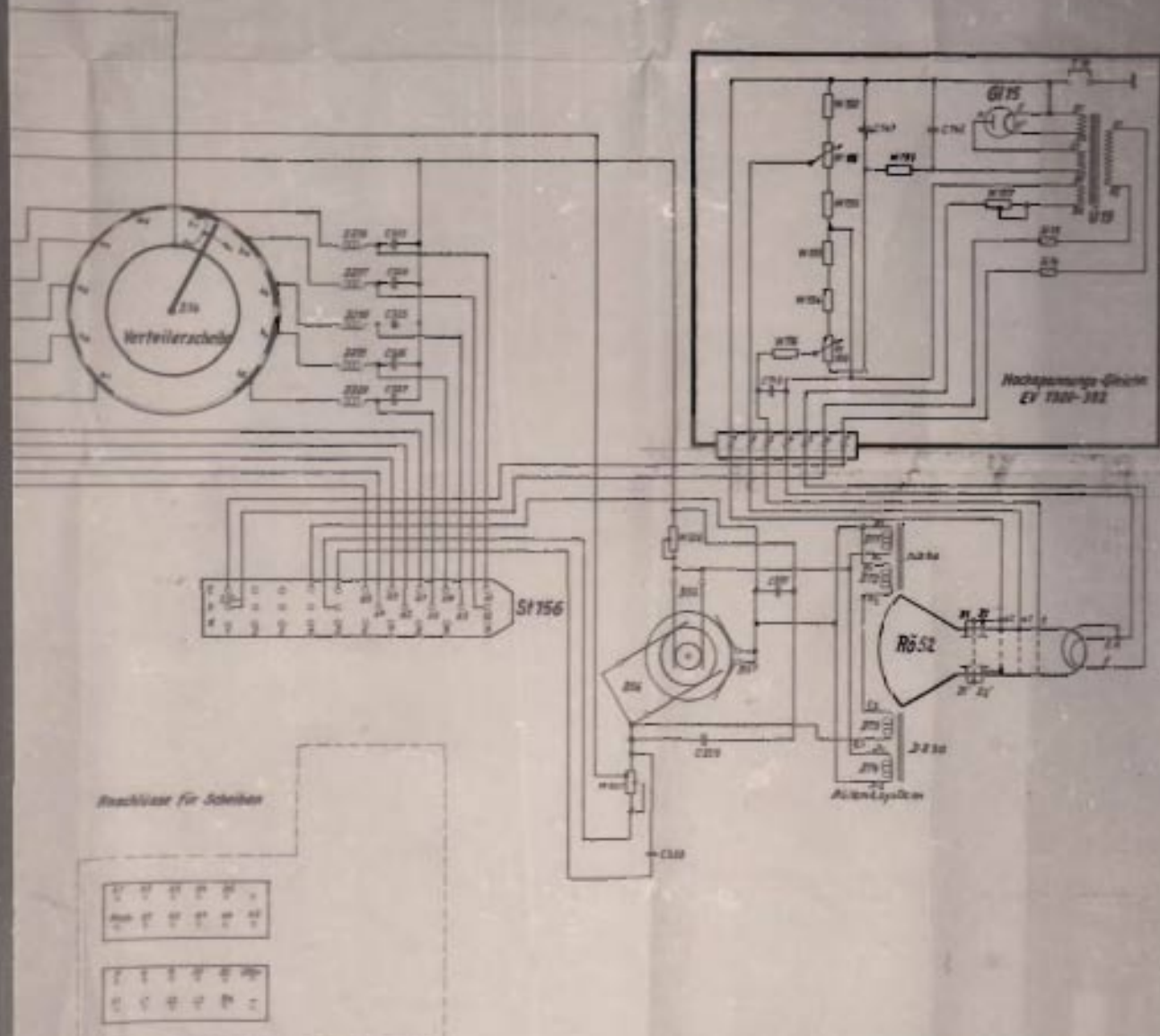
CPSL 1513-165

LORENZ

Schaltbild für Defehisteil

<u>Diagram number</u>	<u>name</u>	<u>designation</u>	<u>Electrical data and notes</u>
1	Copper brushes for test transmitter	Lg.Nr. 41 856	
2	Copper brushes as B51		
B53	2 copper brushes	Lg.Nr. 41 856	
B54	2 copper brushes as B53		
B55	Carbon brushes for deflection system	3 x 4 x 8 long Quality C 76a	
B56	Carbon brushes as B55		
B57	Carbon brushes as B55		
C301	Cylinder condensor	KA 10813A	0.1 μ F 250 volt
C302 - 315	cylinder condensor	KA 10811A	25000 μ F 250 volt
C316 - 317	Cylinder condensor	KA 10811A	25000 μ F 250 volt
C318 - 327	Cylinder condensor	KA 10809A	10000 μ F 250 volt
C328	Cylinder condensor	KA 10811A	25000 μ F 250 volt
C329	Cylinder condensor	KA 10813A	0.1 μ F 250 volt
C330	Condensor	KA 10564A	2 μ F 120 volt
C331	Cylinder condensor	KA 10813A	0.1 μ F 250 volt
D201 - D202	H.F. Choke	EO 113 224	15 mh \pm 20% 525 turns of 0.1 copper wire. R=41 ohms \pm 20%
D203 - D210	H.F. Choke	Same as D201	
D211 - D220	Air choke	Spool E 104 694	130 turns 0.3 copper wire. 3 grooves 35 turns each, 1 narrow groove with 25 turns.
Ma1	Driving motor	Sk 813 852 - (St 773501)	
R51	Eisemann relay	Type Sk 787832/I	

	<u>name of item</u>	<u>factory designation</u>	<u>electrical data and remarks</u>
	Vacuum tube	RV 12 P 2000	
	CR Tube	Philips DN 7-2	
	Short circuiting plug	EV 1309-276	
U48	Tumbler switch	Sk 651 371	
St155- St156	Contact strip	30 pole Rel ale 37a	
W303-W321	Wire resistance	Spool 0 5665, 8.2 mm diam. x 45 mm	2 x 0.6 ohms. Konstantan 0.6 mm diam.
W322	Wire resistance	Spool 20 mm diam x 120 mm long	1.5 ohm 10 amp. with 3 tapping clips. Konstantan 1.2 mm diam.
W323	Wire resistance	Spool 10 mm diam. x 50 mm long	20 ohm 0.35 amp. with 1 movable tap- ping clip
W324	Fixed resistance	Da 400,000 ohm	5 DIN 41401
W325	Fixed resistance	Da 100,000 ohm	5 DIN 41403
W326	Wire resistance	Spool 10 mm diam. x 50 mm long.	As W323 except 25 ohm 0.6 amp.
W327	Wire resistance	Spool 10 mm diam. x 50 mm long	250 ohm 50 milliamp with 2 movable tap- ping clips.
W328	Fixed resistance	Da 500,000 ohm	5 DIN 41403
W329	Fixed resistance	Da 30,000 ohm	5 DIN 41403
W330	Straight wire resistances	Konstantan 0.8 mm diam. 30 mm long	Insert when testing!
O 332	Cylindrical condenser	KA 10811A	25000 μF 250 Volt



<p>Das Schaltbild ist eine Darstellung der elektrischen Schaltung eines Gerätes. Es ist nicht zu verwenden, um das Gerät zu reparieren oder zu modifizieren. Es ist nur für die Identifizierung der Bauteile und die Überprüfung der Verdrahtung zu verwenden.</p>	
<p>Titel</p>	<p>EV 1300-312</p>
<p>Zeichner</p>	<p>EV 1300-312</p>
<p>Geprüft</p>	<p>EV 1300-312</p>
<p>Freigegeben</p>	<p>EV 1300-312</p>
<p>Gezeichnet</p>	<p>EV 1300-312</p>
<p>Geprüft</p>	<p>EV 1300-312</p>
<p>Freigegeben</p>	<p>EV 1300-312</p>
<p>Gezeichnet</p>	<p>EV 1300-312</p>
<p>Geprüft</p>	<p>EV 1300-312</p>
<p>Freigegeben</p>	<p>EV 1300-312</p>

Schaltbild f. Mechanik

<u>Program number</u>	<u>number of items</u>	<u>name and description</u>	<u>maker's designation and specification</u>
1	1	Fixed resistance	Da 1000 ohms 5DIN4.1401
2	1	Fixed resistance	S 80000 ohms 5DIN4.1404
W133	1	Fixed resistance	Da 200 ohms 5DIN4.1401
W134	1	Fixed resistance	Same as W133
W135	1	Fixed resistance	Da 80000 ohms 5DIN4.1401
W136	1	Fixed resistance	Da 100000 ohms 5DIN4.1403
W137	1	Fixed resistance	Da 50000 ohms 5DIN4.1403
W138	1	Fixed resistance	Da 8000 ohms 5DIN4.1403
W139	1	Fixed resistance	Da 1000 ohms 5DIN4.1401
W140	1	Fixed resistance	Da 20000 ohms 5DIN4.1403
W141	1	Fixed resistance	Da 800 ohms 5DIN4.1401
W142	1	Fixed resistance	Da 30000 ohms 5DIN4.1401
W143	1	Fixed resistance	Same as W142
W144	1	Fixed resistance	Da 20000 ohms 5DIN4.1403
W145	1	Fixed resistance	Same as W144
W 146	1	Fixed resistance	Da 300 ohms 5DIN4.1403
W147	1	Fixed resistance	Same as W146
W148	1	Fixed resistance	Da 30 ohms 5DIN4.1401
W149	1	Fixed resistance	Same as W148

DV St 1309 - 202

Synchronisierungs-Verstärker

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Authority NW 32823
By S/NARA Date 11/9/12

<u>gran ber</u>	<u>number of items</u>	<u>name and description</u>	<u>maker's designation and specification</u>
0	1	Fixed resistance	Same as W 148
1	1	Fixed resistance	Same as W148
2	1	Fixed resistance	Same as W148
W153	1	Fixed resistance	Same as W148
W154	1	Fixed resistance	Same as W148
W155	1	Fixed resistance	Same as W148
W156	1	Fixed resistance	Da 50000 ohms 4,1401
W157	1	Wire resistance	300 ohms with tapping clip. 13 mm. diameter, 46 mm. long. Rated at 0.54 watts.
C81	1	Condensator	Lorenz KA 10324 2 μ F Working voltage 250
C82	1	Condensator	Lorenz KA 10807 A 2500 μ F Working voltage 250
C83	1	Condensator	Lorenz KA 10809 A 10 000 μ F Working voltage 250
C84	1	Condensator	Same as C81
C85	1	Condensator	Same as C83
C86	1	Condensator	Same as C83
C87	1	Condensator	Lorenz KA 10322 0,5 μ F Working voltage 250

DV St 1309 - 202

Synchronisierungs-Verstärker

<u>gran ber</u>	<u>number of items</u>	<u>name and description</u>	<u>maker's designation and specification</u>
	1	electrolitic condensor	50 μ F 30/35 V 1 DIN 41335
	1	Condensor	Lorenz KA 10808 A 5000 μ F Working voltage 250
C90	1	Condensor	Same as C89
C91	1	Condensor	Same as C89
C92	1	Condensor	Same as C89
C93	1	Condensor	Same as C89
C94	1	Condensor	Same as C89
C95	1	Condensor	Same as C89
C96	1	Condensor	Same as C89
C97	1	Condensor	Same as C89
C98	1	Condensor	Same as C89
C99	1	Condensor	Same as C89
C101	1	Condensor	Lorenz KA 10565 B 4 μ F Working voltage 120
C102	1	Electrolitic condensor	Same as C88
C103	1	Condensor	Lorenz KA 10344 2 μ F Working voltage 500
C104	1	Condensor	Lorenz KA 10370 A 0,1 μ F Working voltage 250

DV St 1309 - 202

Synchronisierungs-Verstärker

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By 220 NARA Date 11/9/12

<u>item number</u>	<u>number of items</u>	<u>name and description</u>	<u>maker's designation and specification</u>
5	1	Condensor	Lorenz KA 10811 A 25000 μF Working voltage 250
6	1	Condensor	Lorenz KA 10343 1 μF Working voltage 500
C107	1	Condensor	Same as C103
C108	1	Condensor	Lorenz KA 10833 A 25000 μF Working voltage 750
C109	1	Condensor	Same as C108
C110	1	Electrolitic condensor	Same as C88
C111	1	Electrolitic condensor	Same as C88
C112	1	Condensor	Same as C101
C113	1	Variable condensor	Max. 5000 μF , working voltage 250, -10% +20%, made by Ritscher
D25	1	choke-coil	Sk 641 891 housing pos. 1, type XV Core Sk 663 24/I 10000 turns 0.1 copper wire, 2000 ohms, 45 henries. tested for max. 1500 volts, thickness .35 mm. with air gap on one side.
R016	1	Vacuum tube	LW 3
R017	1	Vacuum tube	RVP 2000
R018	1	Vacuum tube	Same as R016

DV St 1309 - 202

Synchronisierungs-Verstärker

<u>gram ber</u>	<u>number of items</u>	<u>name and description</u>	<u>maker's designation and specification</u>
	1	Vacuum tube	Same as R816
	1	Single pole multiple contact switch	sk 602 272
U5	1	audio trans- former.	Similar to EO 123 724, but winding A ₁ -A ₂ 4500 turns 0.1 copper wire, B ₁ -B ₂ 1000 turns 0.1 copper wire.
U6	1	Intermediate transformer	Sk 641 891 housing, pos. 1 type XV A ₁ -A ₂ 1000 turns 0.1 copper wire Dt62a B ₁ -B ₂ 1000 turns 0.1 copper wire Dt62b C ₁ -C ₂ 2000 turns 0.1 copper wire Dt62a D ₁ -D ₂ 2000 turns 0.1 copper wire Dt62b Tested for max. 1500 volts Internal insulation oiled paper .1 mm thick, single layer. Plates alternately reversed.
U7	1	Output transformer	Similar to O31551/II but alternately reversed and contact plate with 6 soldering tabs. A ₁ -A ₂ 1100 turns 0.14 copper wire Dt62a

DV St 1309-202
Synchronisierungs-Verstärker

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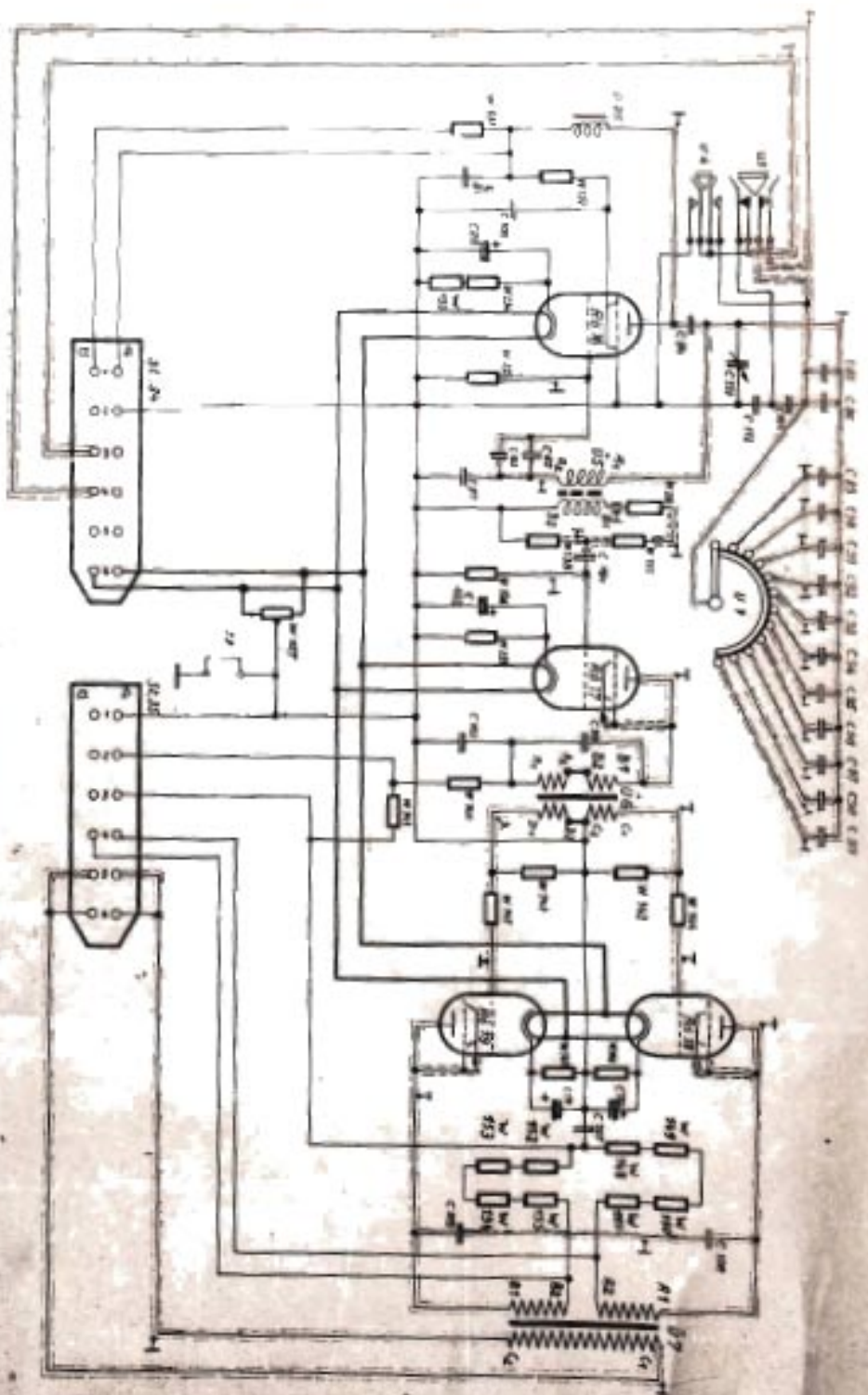
By SAJ NARA Date 1/19/12

<u>Program number</u>	<u>number of items</u>	<u>name and description</u>	<u>maker's designation and specification</u>
			B ₁ -B ₂ 1100 turns 0.1 copper wire DT62b
			C ₁ -C ₂ 90 turns 0.7 copper wire D62a
			Tested for 1500 volts=500 cycles. Wound in layers, one sheet oiled paper 0.1 mm, after every second layer, two sheets between windings.
T5	1	Overload breaker	Sk 665 010
St 34	1	Contact strip	12 pole Rel. als. 34a
St 35	1	Same as St 34	
U4	1	Push-button switch	Rafi Li Nr. 433/3 for two working contacts, with white button.
U5	1	Push-button switch	Rafi Li Nr. 433/26 for two working contacts with red button

DW St 1309-202

Synchronisierungs-Verstärker

Authority NW 32823
 By 62W NARA Date 4/2/72



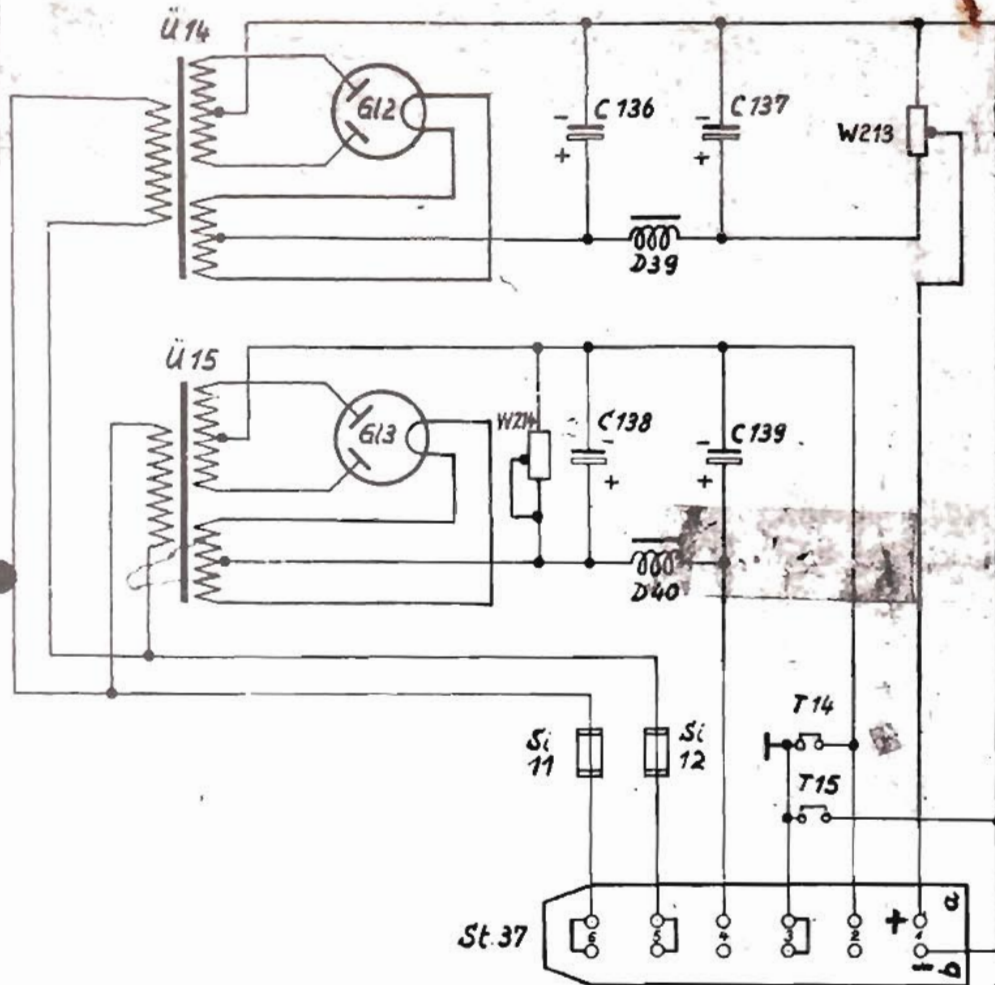
	Designation of new systems, sub-variants, variations and models in each division of output	
	541	Synchronisierungsverstärker
Best.-Nr. 1309	Zeichn.-Nr. DV St 1309 - 202	Fert.-Nr.
6X4	6AV6	6AR5
6AV6	6AV6	6AR5

SECRET

59.

<u>Diagram number</u>	<u>number of items</u>	<u>name and description</u>	<u>maker's designation and specification</u>
C136	1	Electrolytic condensor	16 μ F 500/550 V
C137	1	Electrolytic condensor	Same as C136
C138	1	Electrolytic condensor	Same as C136
C139	1	Electrolytic condensor	Same as C136
D39	1	Mains choke	Kazda Nr. 19394
D40	1	Mains choke	Same as D39
G12	1	Rectifier tube	AZ 12 Telefunken
G13	1	Rectifier tube	Same as G12
S111	1	Fuse	Wickmann FT 4 1.5 Amp. PL Nr. 19126
S112	1	Fuse	Same as S111
St37	1	12 pole contact strip	Rel ale 34a
T14	1	Short circuiting plug	EV-1309-276
T15	1	Short circuiting plug	Same as T14
Ü14	1	Power transformer	Makers Kazda No. 19752 Prim.: 220 V. 50 cycles Sec. I: 2 x 250 v. 0.1 amps Sec. II: 2 x 2 v. 2.3 amps Specification and design as Kazda Blueprint No. 4601
Ü15	1	Power Transformer	Makers Kazda No. 19753 Prim.: 220 V 50 Cycles Sec. I: 2 x 400 V., 0.15 A. Sec. II: 2 x 2 V., 2.3 A. Specifications and designs from Kazda blueprint No. 5020
W213	1	Resistance	10,000 ohms 20 Watts with tapping clip 30 mm. diam., 120 mm. long.
W214	1	Resistance	Same as W213

1309



Werkstoff		5	1309 - 3		25.1.44	<i>[Signature]</i>
		3	Änderung		3.11.43	<i>[Signature]</i>
Maßstab		Tag/		Zeichnung-Nr		
		Entworfen 12.5.43		EV St 1309 - 200		
Paßmaß		Geprüft		Ersatz für		
Abmaß		Normgegr.				
				<h1>Röhrengleichrichter I</h1>		
		541				

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61.

<u>diagram number</u>	<u>number of items</u>	<u>name and description</u>	<u>maker's designation and electrical data</u>
C131	1	Electrolytic condensor	32 μ F 350 V
C131a	1	Electrolytic condensor	Same as C131
C132	1	Electrolytic condensor	Same as C131
C132a	1	Electrolytic condensor	Same as C131
C133	1	Electrolytic condensor	Same as C131
C133a	1	Electrolytic condensor	Same as C131
D36	1	Mains choke	Kazda Nr. 19394 (Görler D5)
D37	1	Mains choke	Same as D36
G11	1	Rectifier tube	AZ 12 Telefunken
S19	1	Fuse	Wickmann FT 3 0.5 Amp. PL.Nr. 19120
S10	1	Fuse	Same as S19
St36	1	12-pole contact strip	Rel ale 34a
Stv1	1	Stabilisor	St.V 280/80 Z Stabilovolt
T13	1	Short circuiting plug	EV 1309-276
Ů13	1	Transformer	Maker Kazda no. 19754 Prim.: 220 V 50 cycles Sec. I: 2 x 450 V. 0.08 Amp. Sec. II: 2 x 2 V 2.3 Amp. Specifications and design as Kazda blueprint no. 4601.

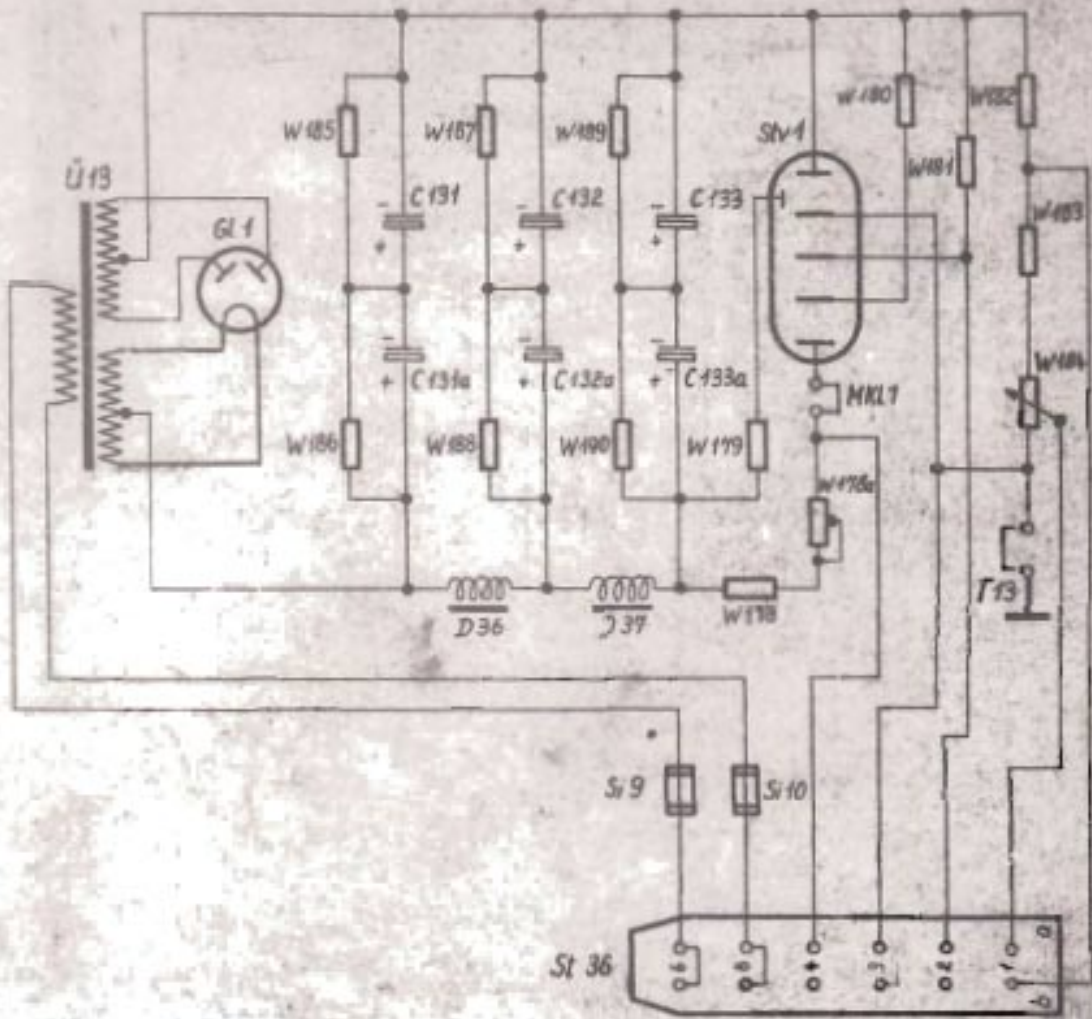
EVst 1309-201

Röhrengleichrichter II

<u>Program number</u>	<u>number of items</u>	<u>name of item</u>	<u>electrical data and designation</u>
W178a	1	Resistance	1600 ohm 10 watt with a tapping clip. 18 mm diam 75 long
W178	1	Resistance	As 178a but without clip
W179	1	Fixed resistance	Da 300,000 ohms 5DIN41403
W180	1	Fixed resistance	Da 300,000 ohms 5DIN41403
W181	1	Fixed resistance	Same as W180
W182	1	Fixed resistance	Da 10,000 ohms 5DIN41403
W183	1	Fixed resistance	Da 5,000 ohms 5DIN41403
W184	1	Variable resistance	10,000 ohms EN 89 lin.
W185	1	Resistance	S 100,000 ohms 5DIN41404
W186	1	Resistance	Same as W185
W187	1	Resistance	Same as W185
W188	1	Resistance	Same as W185
W189	1	Resistance	Same as W185
W190	1	Resistance	Same as W185
MKL1	1	Testing terminal	ZO 500 551

1309

A
B
C
D
E
F
G



Werkstoff		1309-5		13.1.57	
Maßstab		1:1		21.10.57	
Zeichnung-Nr.		EV St 1309-201		1.4.58	
Ersatz für		1309-2		1.4.58	
Titel		Röhrengleichrichter II		Tag	
Blatt		1 von 1		Blatt	
Maßstab		1:1		Blatt	
Blatt		1 von 1		Blatt	
Blatt		1 von 1		Blatt	



Röhrengleichrichter II.

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64.

<u>Diagram number</u>	<u>Name of item</u>	<u>Factory designation</u>	<u>Electrical details and notes</u>
125	Electrolytic condensor	1 DIN 41 336	500 MF 20/25 Volt
126	Electrolytic condensor	Same as C 125	
C 127	Electrolytic condensor	Same as C 125	
C 128	Electrolytic condensor	Same as C 125	
C 128a	Electrolytic condensor	K A 11 317	2500 MF 12/15 Volt
W 174	Resistance	Fa. Reichardt	25 ohms 15 Watts with tapping clip. 15 mm diam., 70 mm long
W 174a	Resistance	Fa. Reichardt	200 ohms 0.1 amp with tapping clip. 15 mm diam., 70 mm long.
D 33	L.F. Choke	Görler D 36	About 20 mhy at-amps D.C. pre-magnetisation. 0.1 ohms D.C. resistance. Tropical model
D 34	L.F. CHOKE	SK 833 241/I	1 ohm winding N 730 011/16
D 34a	L.F Choke	Same as D 34	
SI 7	Fuse	Wickmann FT 3	0.5 amp P1 Nr.19 120
SI 8	Fuse	Same as SI 7	
St 41	12 pole contact strip	Rel ale 34a	
T 12	Short circuiting plug	EV 1309-276	
U 12	Transformer	Fa. Kazda Nr.19 924	Primary: 210/220/230V Sec. I: 0/0.5/1/1.5/21/23/25 V 8 amp. 50 cycles Sec. II: 0/0.5/1/18/19.5 V 1 amp. Normal tropical model. Specifications and design as Kazda blueprint No 5590

EV St 1309-778
12 Volt Stufe

SECRET

65.

Diagram
NumberName of itemFactory designationElectrical details
and notes

Vi 12

Selenium rectifier
element

Full-wave Grätz wired. 32 plates 112mm
diam. (2 plates in
series 4 plates in
parallel in each
arm) for D.C. output of
12 V 4 A. Room tempera-
ture 50°C tropical
lacquer.

Vi 12a

Selenium rectifier
element

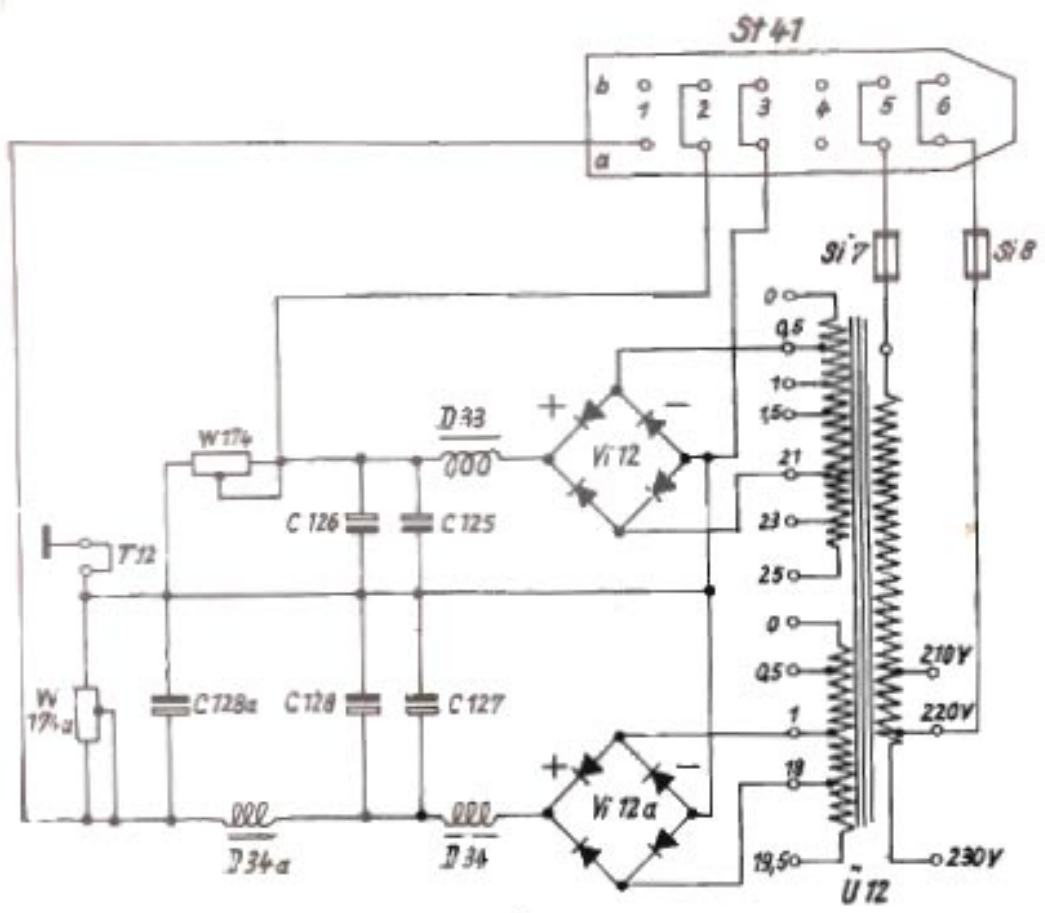
12 V 0.8 A. Each arm
2 plates in series.

E V St 1309-778
12 Volt Stufe

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 By *21* NARA Date *11/1/21*

1309



Werkstoff	00	Änderung		Tag	Name
Maßstab	Entwurf	Tag	Maße	Zeichnung-Nr	
Fußnote: Abmaße	Dieses Maße werden bei Fertigung beachtet sein			EVSt 1309-778	
				Ersatz für EVSt 1309-204	
 DIN 541			<h2>12 Volt-Stufe</h2>		

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M WaN 10513 E

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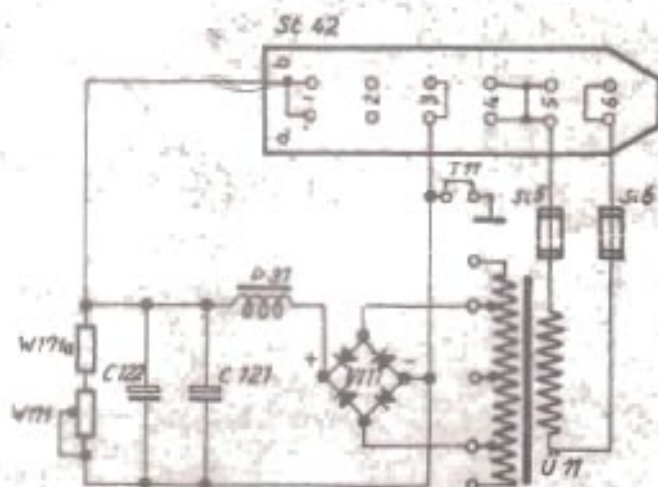
67.

<u>Diagram number</u>	<u>number of items</u>	<u>name and description</u>	<u>makers designation and electrical data</u>
C121	1	Electrolytic condenscr	250 μ F 100/110 volt 1 DIN 41336
C122	1	Electrolytic condenscr	Same as C121
D31	1	Choke	Gürler D35 cap. 0.1 Hy. at 2 Amps D.C. preomagnetization. 1 ohm D.C. resistance. Tropical model.
S15	1	Fuse	Wickmann FT 4 2 A Pl.Nr. 19127
S16	1	Fuse	Same as S15
St42	1	12-point con- tact strip	Rel als 34a
T11	1	Short circuiting plug	EV 1309-276
Ü11	1	Transformer	Makers Kazda No. 19750 Prim.: 210/220/230 V 50 cycles Sec.: 0/1.95/3.9/81/87 V at 3 Amps Short circuit voltage normal. Tropical model. Specifications and design from Kazda Blueprint no. 5172
Vi11	1	Selenium recti- fier element	24 plates 112 ϕ full wave Grätz-wired. (6 plates in series in each arm) for continuous D.C. output of 60 Volts at 1 Amp. Room temperature 50° C. Tropical enamel.
W171	1	Resistance	Maker Reichardt 30 ohms, 60 watts with tapping clip, 25 mm. diam. 120 mm. long, wound with 0.5 mm. diam. Konstantan
W171a	1	Resistance	Maker Reichardt. 40 ohms 60 watts 25 mm. diam. 120 mm. long. wound with 0.5 mm. diam. Konstantan

EVSt 1309-203

60 Volt - Stufe

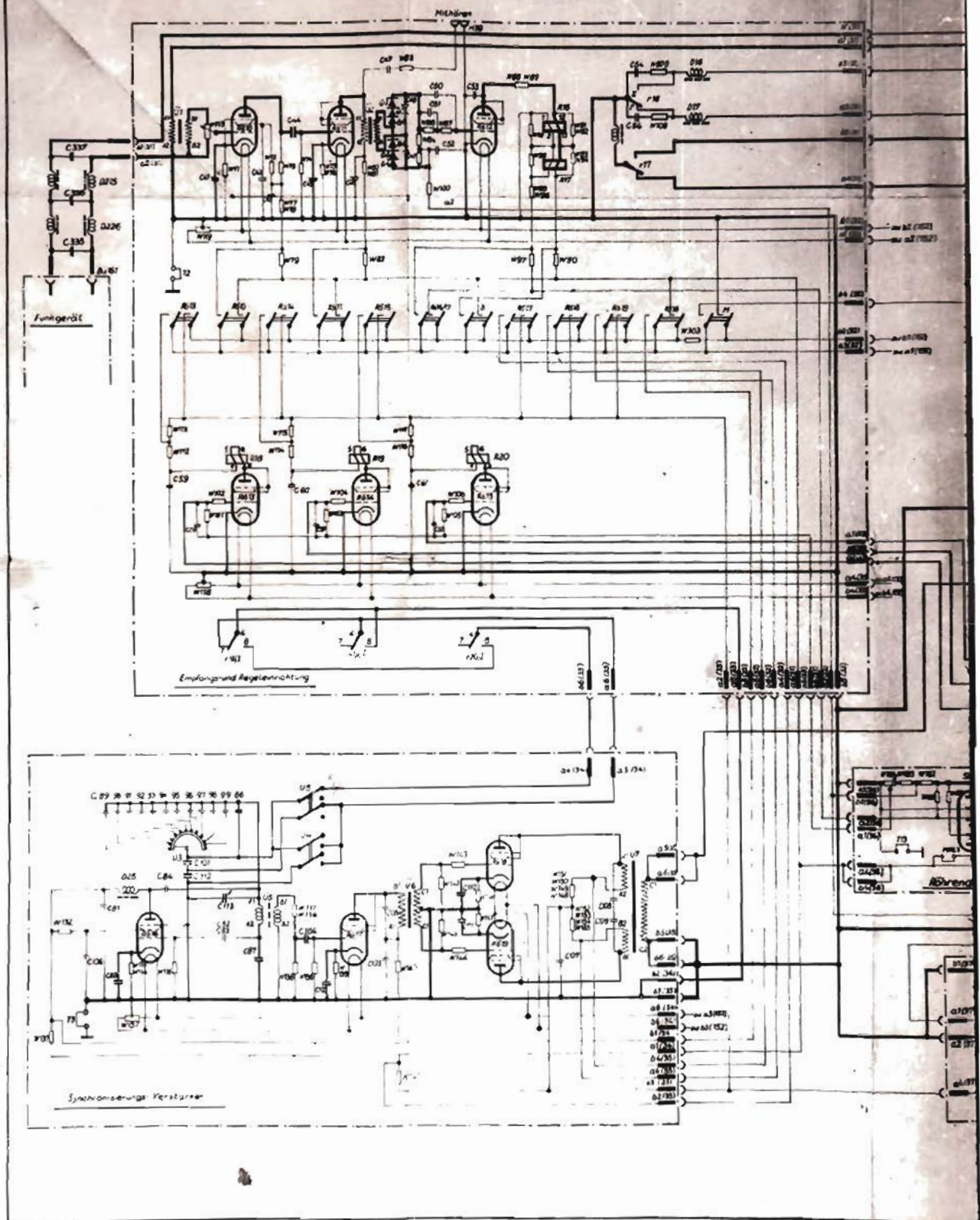
1309

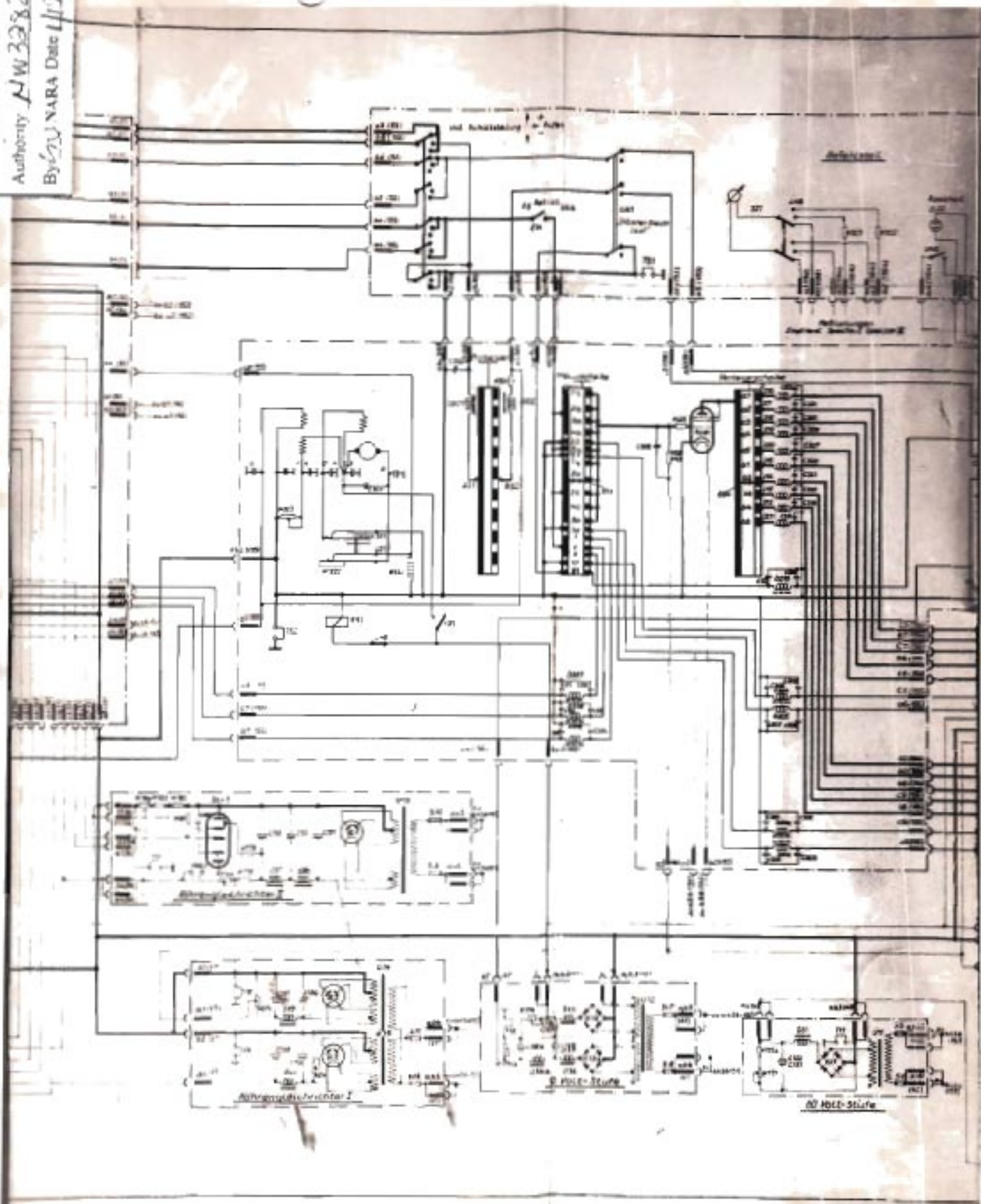


Werkstoff		1		F 4 43	
Maßstab		Zug Name		Zeichnung-Nr	
Paßmaß		Erworben 18.5.55		EV St 1309 -203	
Abstände		Ersetzt für		Ersetzt für	
		541		60 Volt - Stufe	

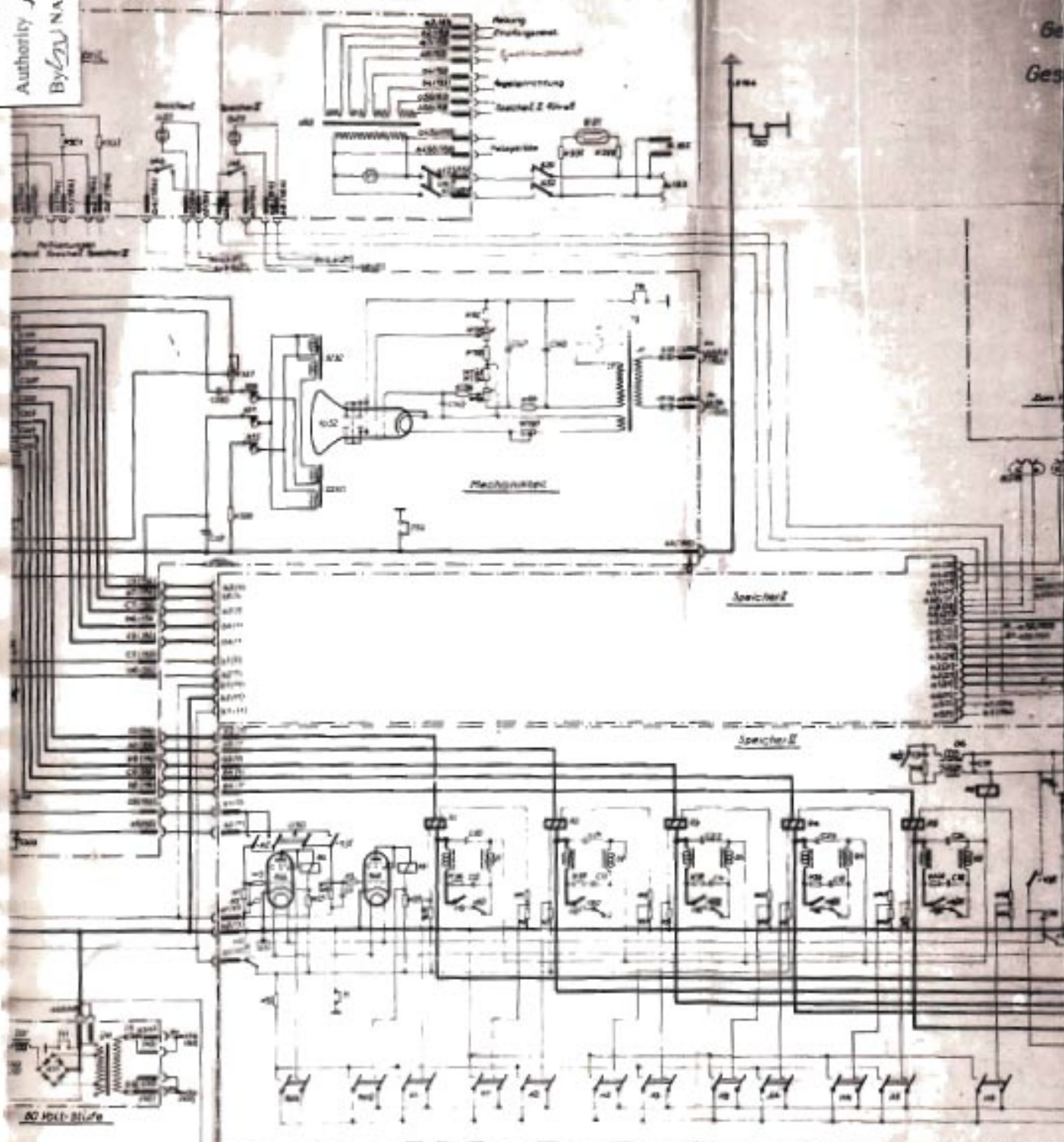
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Gerät 1313
Gesamt-Stromlauf.

